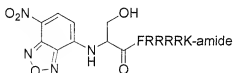


Amendments to the Claims:

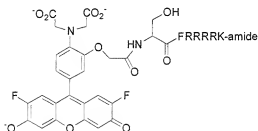
Please cancel Claim 98 without prejudice or disclaimer, and amend Claims 49, 60-66, 80, 88-90, 93, 99, 101, 127-129, 148 and 153 as set forth below.

1-48. (Canceled)

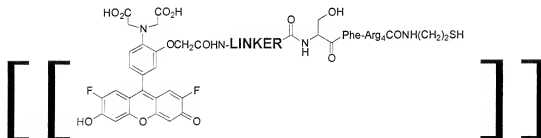
49. (Currently amended) A substrate for a protein kinase, wherein the substrate is selected from the group consisting of:

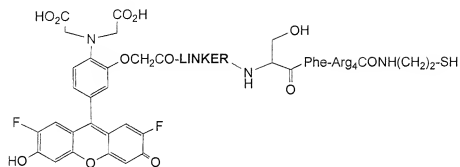


(SEQ ID NO:3),



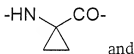
(SEQ ID NO:3), and



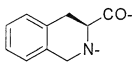


(SEQ ID NO:1);

wherein F is phenylalanine, K is lysine, and R is arginine; and wherein the LINKER is selected from the group consisting of N-methyl glycine, L-proline, D-proline,



and



50-55. (Canceled)

56. (Previously presented) A substrate for a protein kinase or a precursor of the substrate, wherein the substrate or the precursor comprises:

a peptide substrate for the protein kinase, wherein the peptide comprises a serine, a threonine, or a tyrosine on a terminal end of the peptide;

at least one fluorophore, wherein a fluorophore is attached to the serine, the threonine, or the tyrosine on the terminal end of the peptide;

wherein the fluorophore is attached to the peptide by a linker selected from the group consisting of



a



b



c



d



e



f



g



h



i



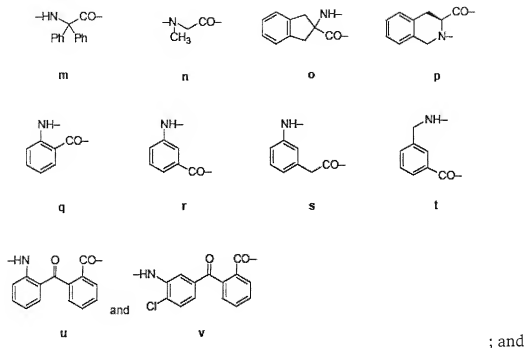
j



k



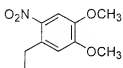
l



wherein

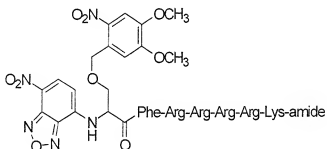
- (i) the substrate is specific for a protein kinase subtype,
- (ii) the fluorophore is attached to the C-terminal end of the peptide,
- (iii) a fluorophore is attached to each terminal end of the peptide,
- (iv) a first fluorophore is attached to a terminal end of the peptide and a second fluorophore, with photophysical properties distinct from the first fluorophore, is attached to any nonterminal site on the peptide,
- (v) the fluorophore is a 7-nitrobenz-2-oxa-1,3-diazole derivative, and/or
- (vi) the substrate further comprises a carbohydrate, a lipid or a nucleic acid.

57. (Previously presented) The precursor of the substrate of claim 148, wherein the photolabile side chain comprises the structure



58. (Previously presented) The precursor of the substrate of claim 56, wherein the precursor of the substrate comprises a serine with a photolabile side chain that blocks phosphoryl transfer.

59. (Previously presented) The precursor of a substrate for a protein kinase, where the precursor comprises SEQ ID NO:3 and has the structure



60. (Currently amended) The precursor of a substrate for a protein kinase ~~substrate or the precursor of the substrate~~ of claim 148, wherein after removal of the photolabile side chain, phosphorylation by a protein kinase of the terminal serine, the terminal threonine, or the terminal tyrosine to which the fluorophore is attached produces at least a 20% change in fluorescence intensity.

61. (Currently amended) The precursor of a substrate for a protein kinase ~~substrate or the precursor of the substrate~~ of claim 148, wherein after removal of the

photolabile side chain, phosphorylation by a protein kinase of the terminal serine, the terminal threonine, or the terminal tyrosine to which the fluorophore is attached produces at least a 20% increase in fluorescence intensity.

62. (Currently amended) The precursor of a substrate for a protein kinase ~~substrate or the precursor of the substrate~~ of claim 148, wherein after removal of the photolabile side chain, phosphorylation by a protein kinase of the terminal serine, the terminal threonine, or the terminal tyrosine to which the fluorophore is attached produces at least a 20% decrease in fluorescence intensity.

63. (Currently amended) The precursor of a substrate for a protein kinase ~~substrate~~ of claim 60, wherein phosphorylation ~~of the substrate~~ by the protein kinase produces at least a 70% change in fluorescence intensity.

64. (Currently amended) The precursor of a substrate for a protein kinase ~~substrate~~ of claim 63, wherein phosphorylation ~~of the substrate~~ by the protein kinase produces at least a 100% change in fluorescence intensity.

65. (Currently amended) The precursor of a substrate for a protein kinase ~~substrate~~ of claim 64, wherein phosphorylation ~~of the substrate~~ by the protein kinase produces at least a 150% change in fluorescence intensity.

66. (Currently amended) The precursor of a substrate for a protein kinase ~~substrate~~ of claim 65, wherein phosphorylation ~~of the substrate~~ by the protein kinase produces at least a 250% change in fluorescence intensity.

67. (Previously presented) The substrate of claim 56, wherein the substrate is specific for a protein kinase subtype.

68. (Original) The substrate of claim 67, wherein the substrate is specific for protein kinase C.

69. (Original) The substrate of claim 68, wherein the substrate is specific for isoforms α , β , and γ of protein kinase C.

70. (Original) The substrate of claim 67, wherein the substrate is specific for protein kinase A, protein kinase B, protein kinase D, protein kinase G, Ca^{2+} /calmodulin-dependent protein kinase, mitogen-activated protein kinase, protein kinase mos, protein kinase raf, protein tyrosine kinase, tyrosine kinase abl, tyrosine kinase src, tyrosine kinase yes, tyrosine kinase fps, tyrosine kinase met, cyclin-dependent protein kinase, or cdc2 kinase.

71. (Previously presented) The substrate or the precursor of the substrate of claim 56, wherein the substrate further comprises a carbohydrate, a lipid or a nucleic acid.

72. (Canceled)

73. (Previously presented) The substrate or the precursor of the substrate of claim 56, wherein the fluorophore is attached to the C-terminal end of the peptide.

74. (Previously presented) The substrate or the precursor of the substrate of claim 56, wherein the fluorophore is attached to the N-terminal end of the peptide.

75. (Previously presented) The substrate or the precursor of the substrate of claim 56, wherein a fluorophore is attached to each terminal end of the peptide.

76. (Previously presented) The substrate or the precursor of the substrate of claim 75, wherein fluorophores with distinct photophysical properties are attached to different terminal ends of the peptide.

77. (Previously presented) The substrate or the precursor of the substrate of claim 56, wherein a first fluorophore is attached to a terminal end of the peptide and a second fluorophore, with photophysical properties distinct from the first fluorophore, is attached to any nonterminal site on the peptide.

78. (Previously presented) The substrate or the precursor of the substrate of claim 56, wherein the fluorophore is a 7-nitrobenz-2-oxa-1,3-diazole derivative.

79. (Previously presented) The substrate or the precursor of the substrate of claim 56, wherein the fluorophore comprises a fluorescein group.

80. (Currently amended) The substrate or the precursor of the substrate of claim 56, wherein the fluorophore comprises a dansyl group, an acridine group, an Alexa Fluor ® group, a BODIPY ® group, an Oregon Green ® group, a Rhodamine Green group, a Rhodamine Red-X group, a Texas Red ® group, a Cascade Blue ® group, a Cascade Yellow group, a Marina Blue ® group, a Pacific Blue group, an AMCA-X group, or a coumarin group.

81-82. (Canceled)

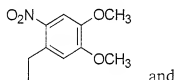
83. (Previously presented) A precursor for a substrate for a protein kinase, wherein the precursor for the substrate comprises:

a peptide comprising a serine, a threonine, or a tyrosine on a terminal end of the peptide;

at least one fluorophore, wherein a fluorophore is attached to the serine, the threonine, or the tyrosine on the terminal end of the peptide; and

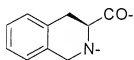
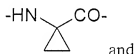
a photolabile side chain attached to the serine, the threonine, or the tyrosine on the terminal end of the peptide, wherein the photolabile side chain blocks transfer of a phosphoryl group from adenosine triphosphate to a hydroxyl moiety of the serine, the threonine, or the tyrosine so that the substrate cannot be phosphorylated by a protein kinase until the photolabile side chain is removed from the substrate, and

wherein the the photolabile side chain comprises the structure



wherein the fluorophore is attached to the peptide by a linker selected from the group consisting of a carboxamide linker, an aminobenzoic acid linker, a sulfonamide linker, a urea linker, a thiourea linker, an ester linker, a thioester linker, an alkylamine linker, an arylamine linker, an ether linker, and a thioether linker.

84. (Previously presented) The substrate or the precursor for the substrate of claim 56, wherein the fluorophore is attached to the peptide by a linker selected from the group consisting of N-methyl glycine, L-proline, D-proline,



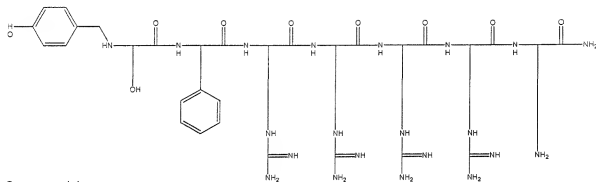
85. (Canceled)

86. (Previously presented) A composition comprising the substrate or the precursor for the substrate of claim 56, and a carrier.

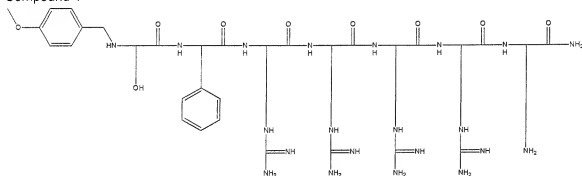
87. (Original) The composition of claim 86, wherein the composition is a pharmaceutical composition and the carrier is a pharmaceutically acceptable carrier.

88. (Currently amended) A chemical compound comprising SEQ ID NO:3 selected from the group of compounds consisting of:

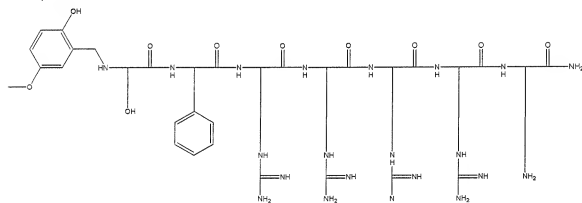
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 12 of 193



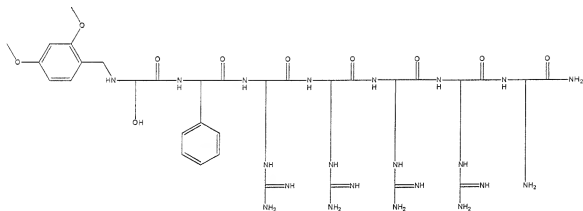
Compound 1



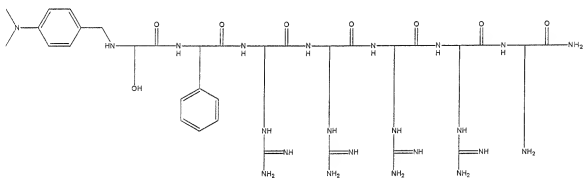
Compound 2



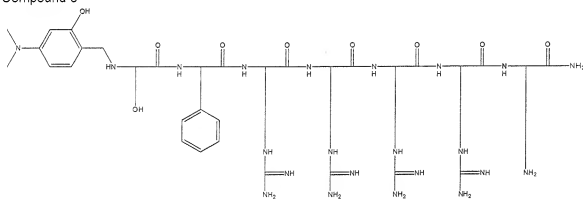
Compound 3



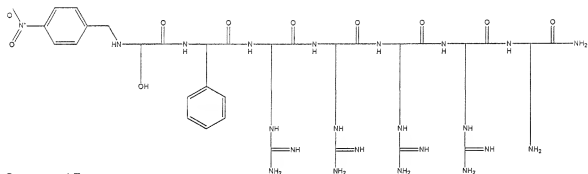
Compound 4



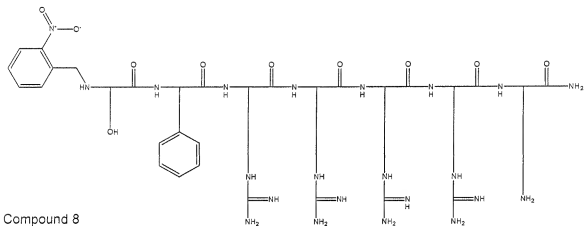
Compound 5



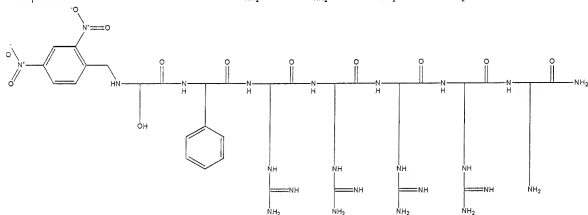
Compound 6



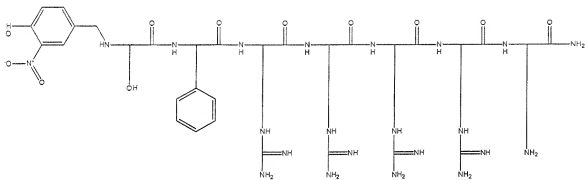
Compound 7



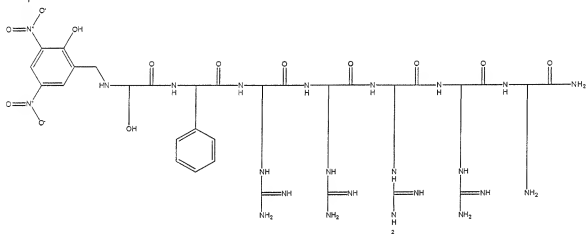
Compound 8



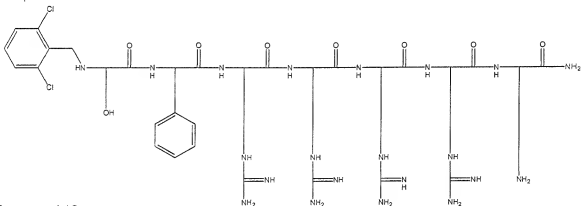
Compound 9



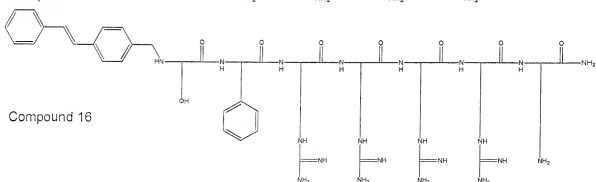
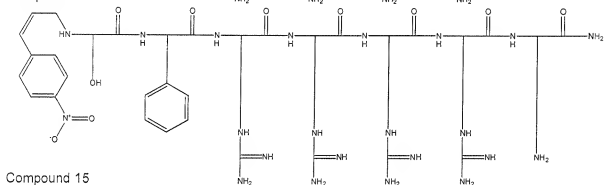
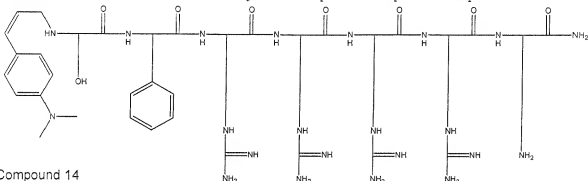
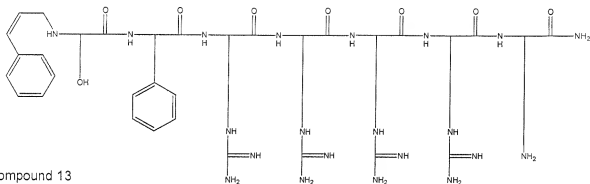
Compound 10

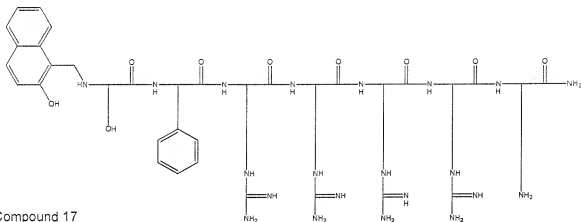


Compound 11

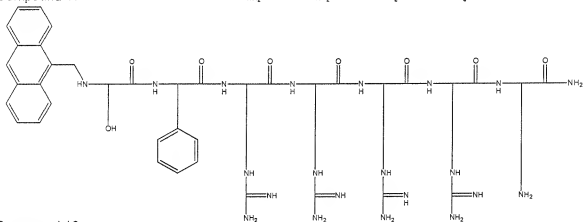


Compound 12

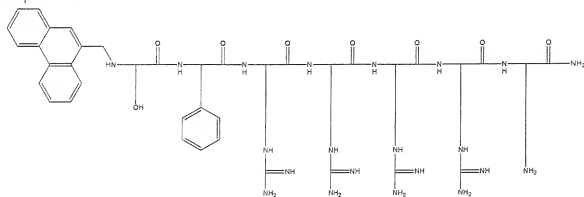




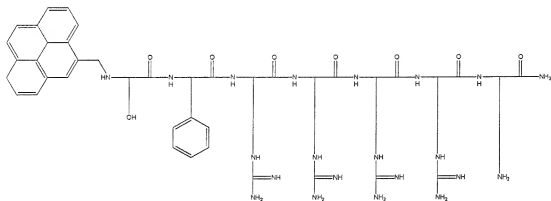
Compound 17



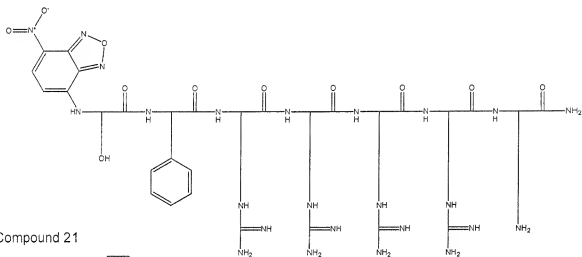
Compound 18



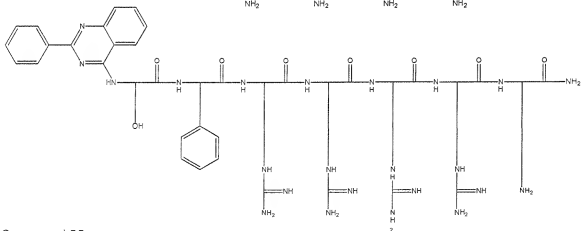
Compound 19



Compound 20

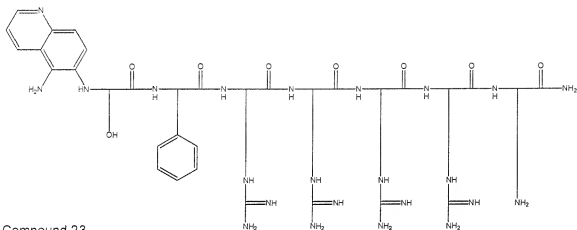


Compound 21

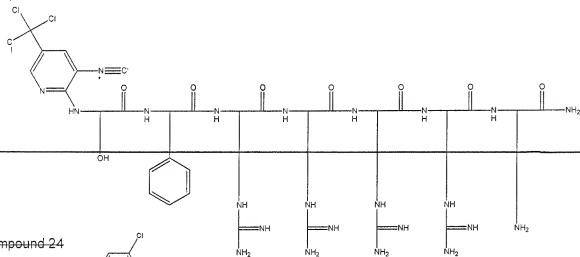


Compound 22

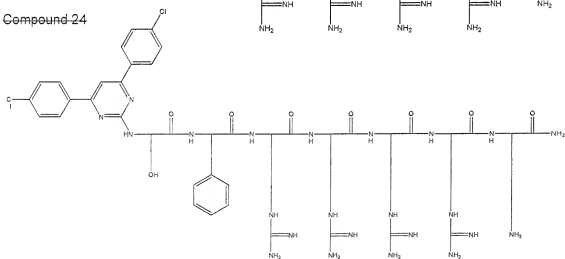
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 19 of 193



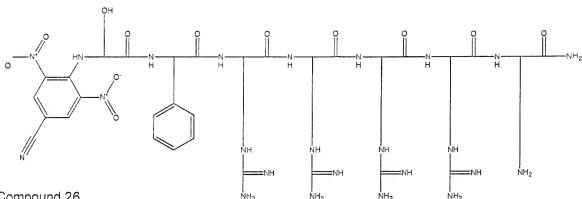
Compound 23



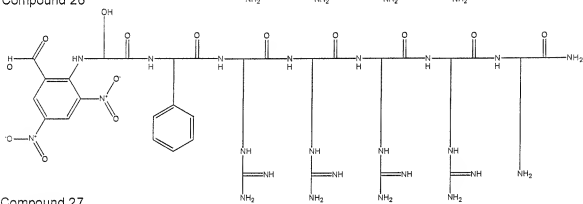
Compound 24



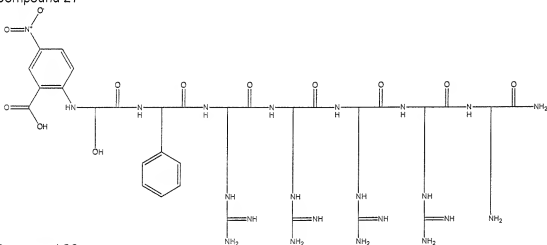
Compound 25



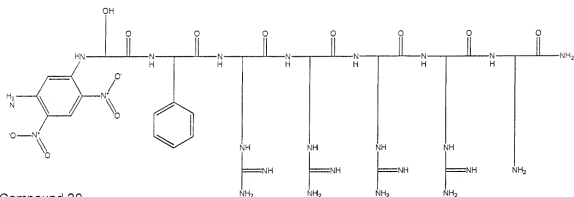
Compound 26



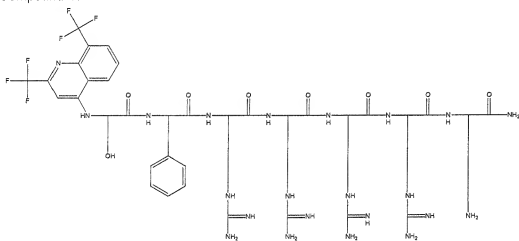
Compound 27



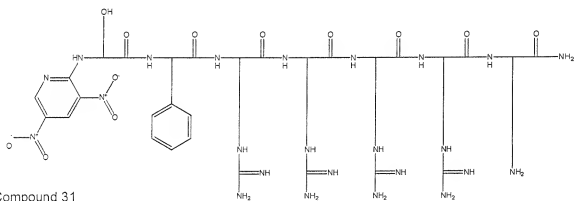
Compound 28



Compound 29

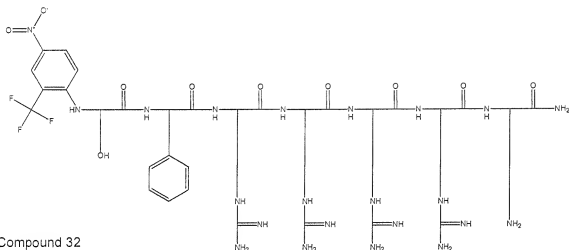


Compound 30

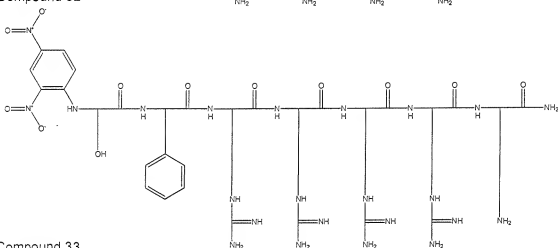


Compound 31

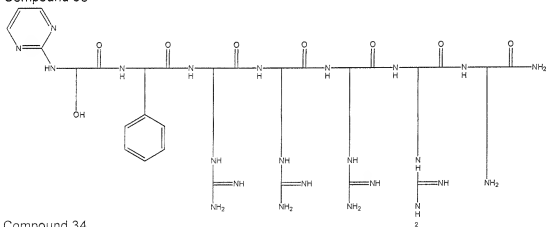
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 22 of 193



Compound 32

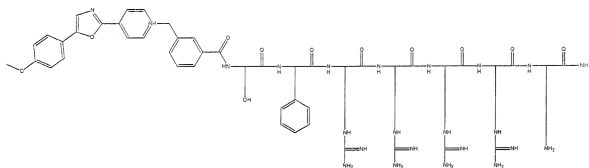


Compound 33

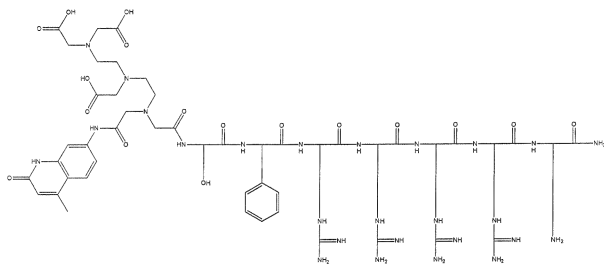


Compound 34

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 23 of 193

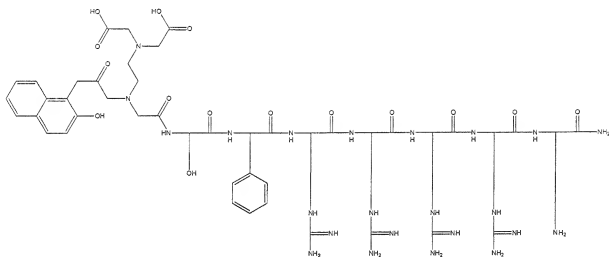


Compound 35

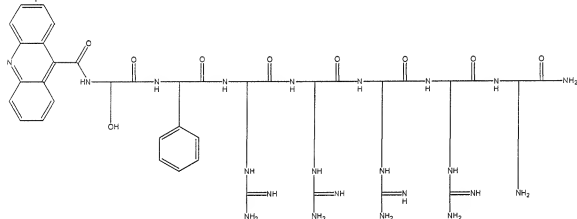


Compound 36

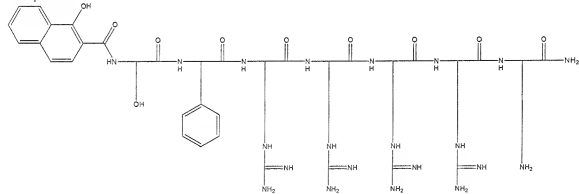
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 24 of 193



Compound 37

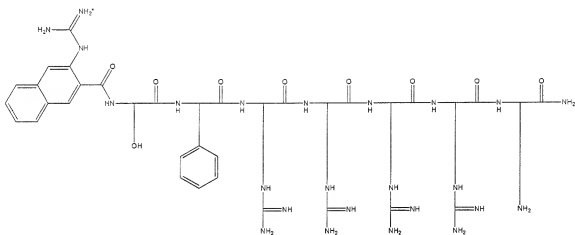


Compound 38

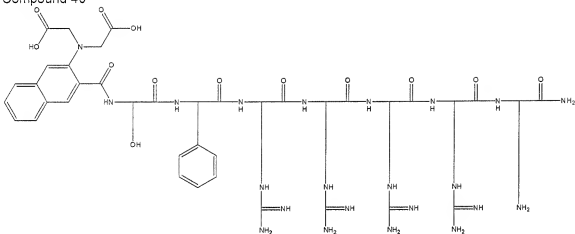


Compound 39

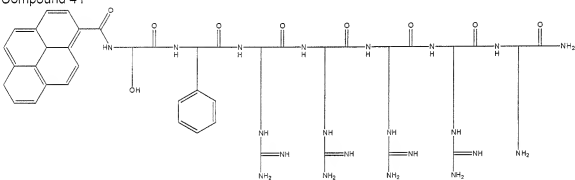
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 25 of 193



Compound 40

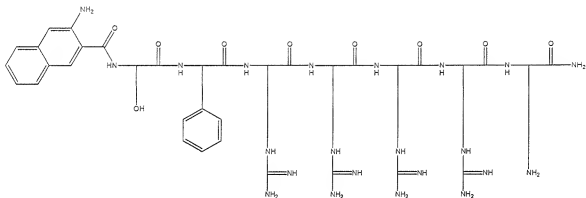


Compound 41

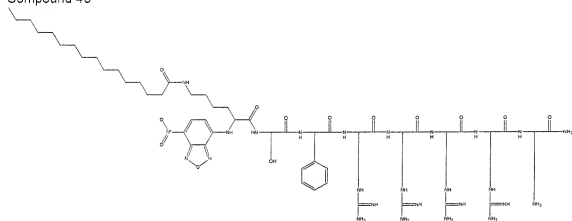


Compound 42

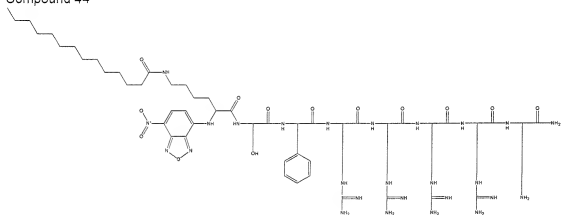
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 26 of 193



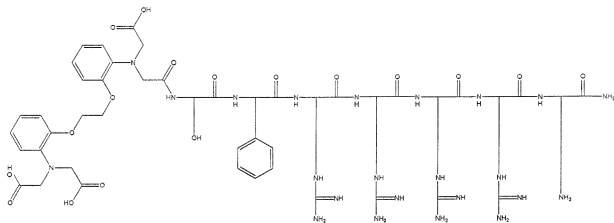
Compound 43



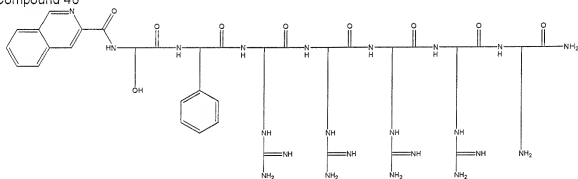
Compound 44



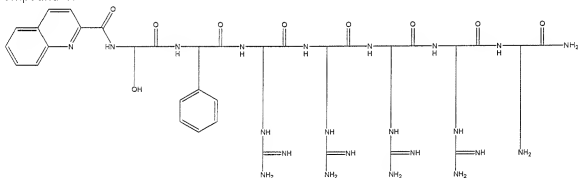
Compound 45



Compound 46

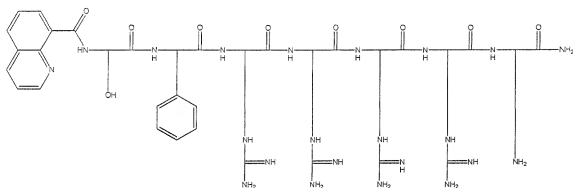


Compound 47

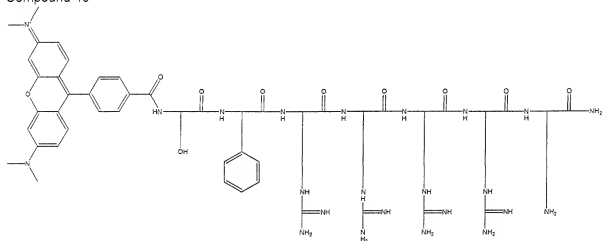


Compound 48

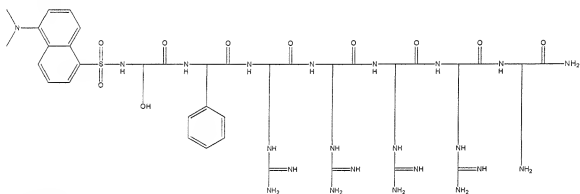
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 28 of 193



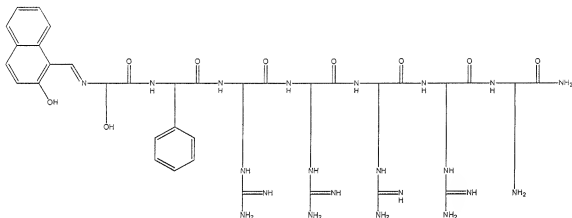
Compound 49



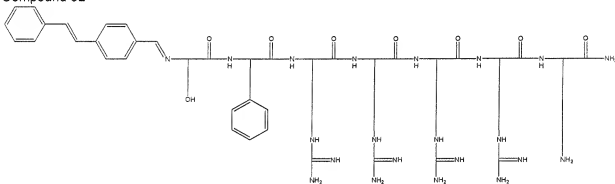
Compound 50



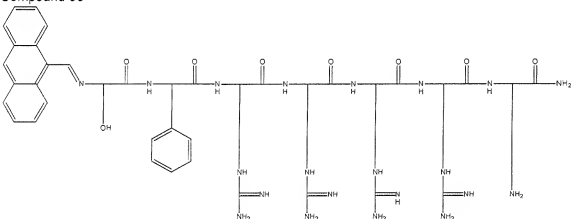
Compound 51



Compound 52

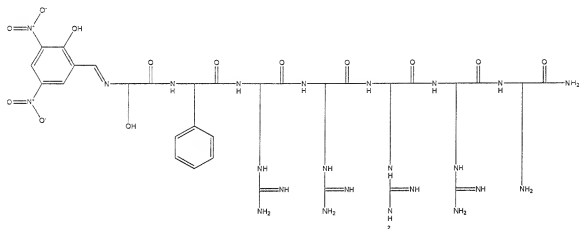


Compound 53

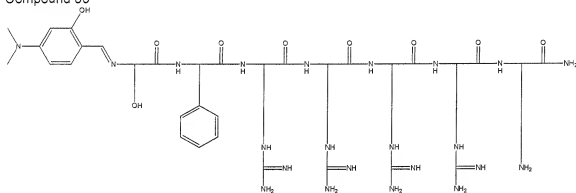


Compound 54

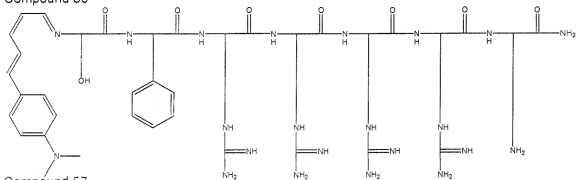
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 30 of 193



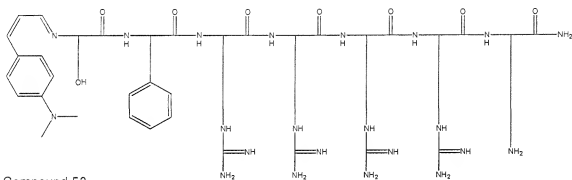
Compound 55



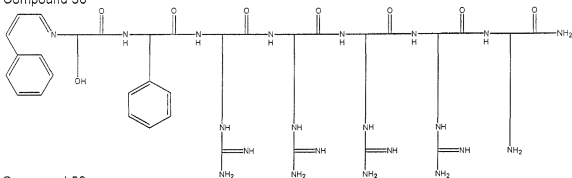
Compound 56



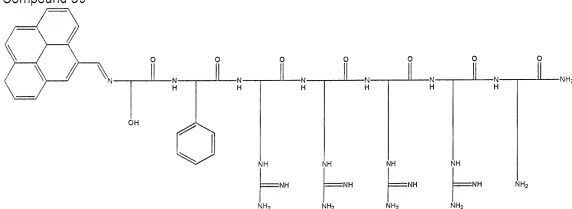
Compound 57



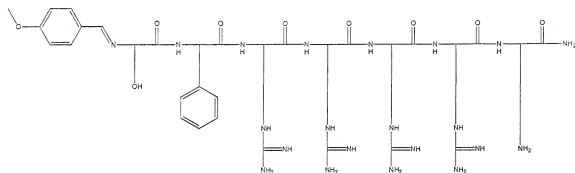
Compound 58



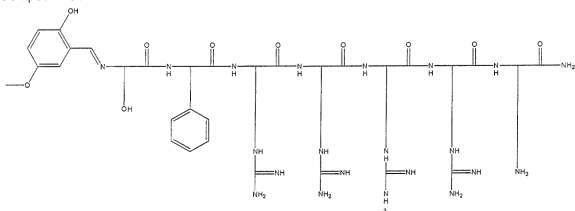
Compound 59



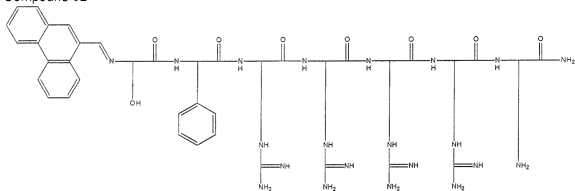
Compound 60



Compound 61

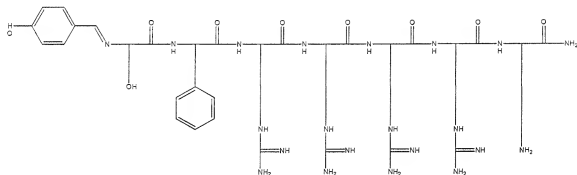


Compound 62

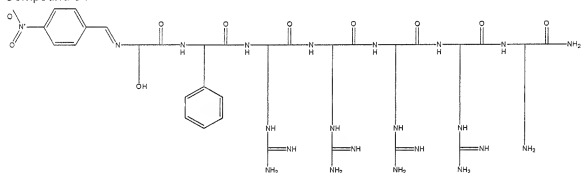


Compound 63

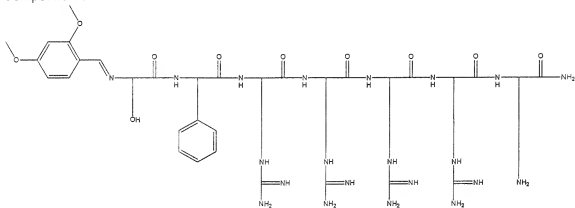
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 33 of 193



Compound 64

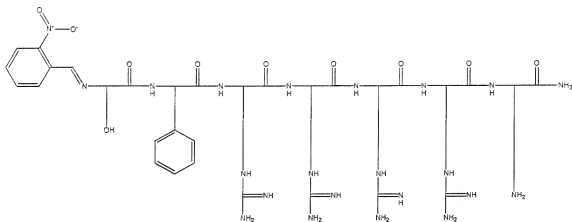


Compound 65

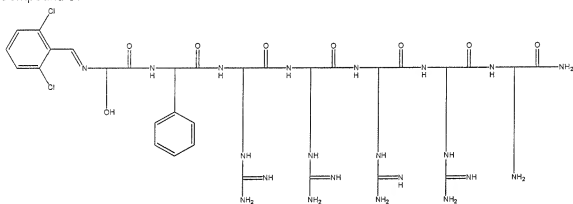


Compound 66

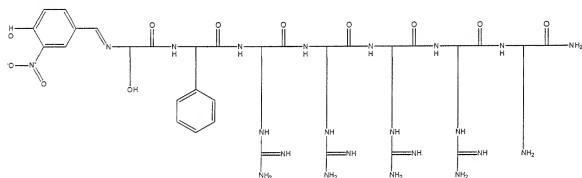
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 34 of 193



Compound 67

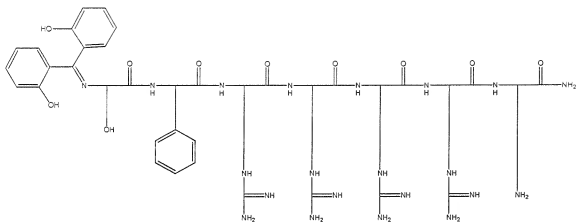
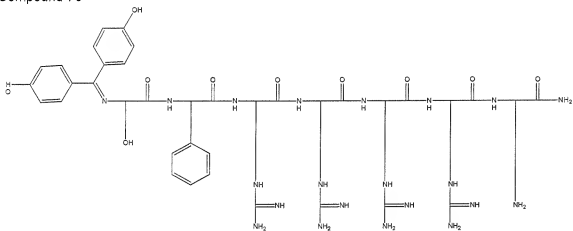


Compound 68

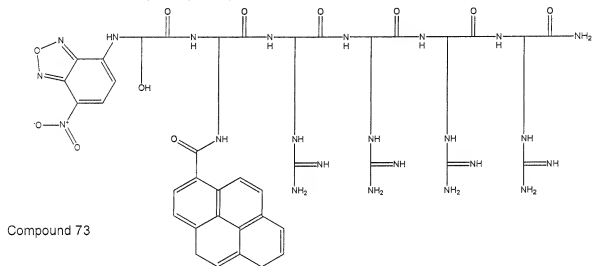
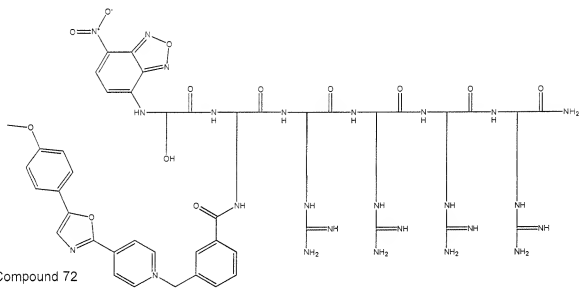


Compound 69

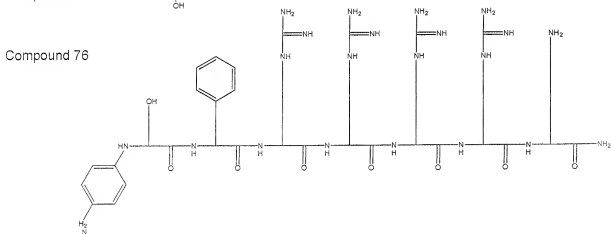
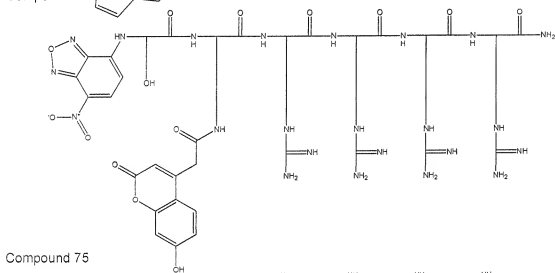
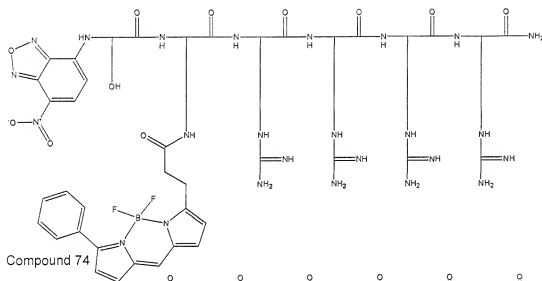
page 35 of 193

Oc1ccc(cc1)/N=C(O)c2ccc(O)cc2

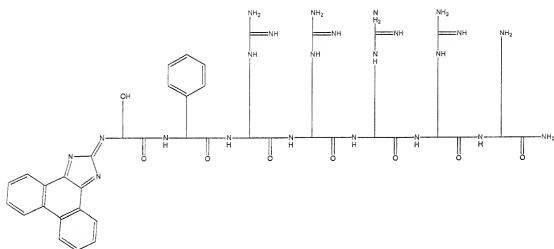
Compound 71



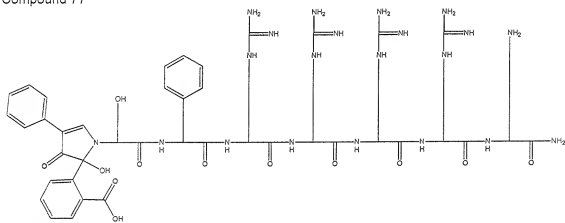
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 37 of 193



Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 38 of 193



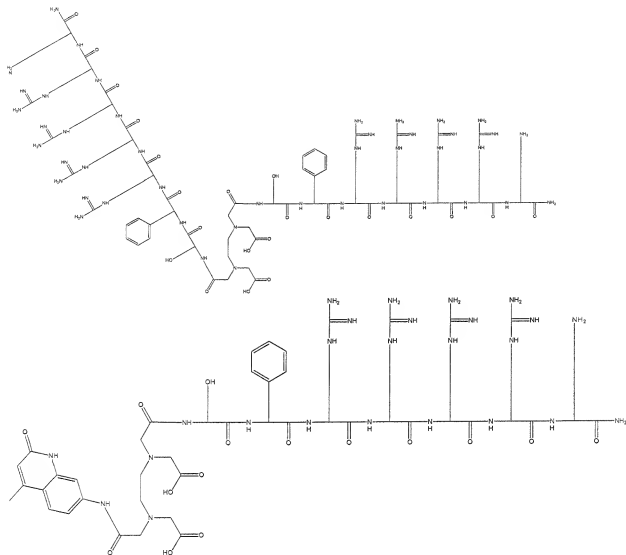
Compound 77



Compound 78

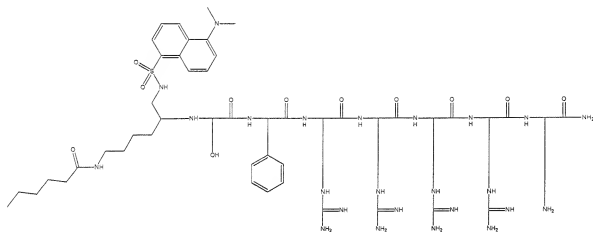
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 39 of 193

Compound 79



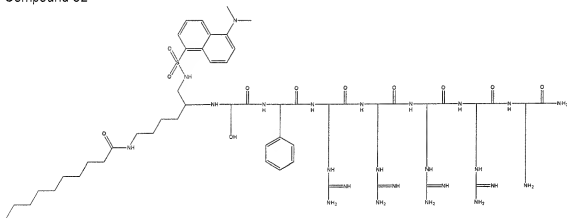
Compound 80

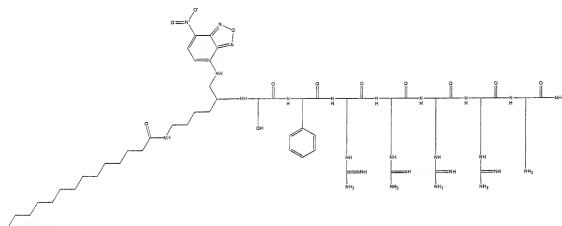
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 40 of 193



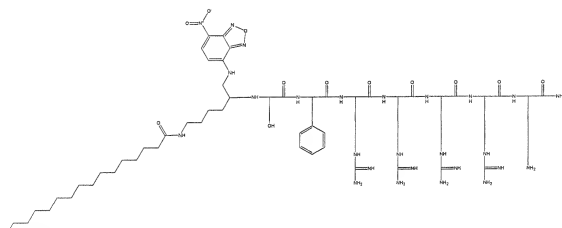
Compound 81

Compound 82

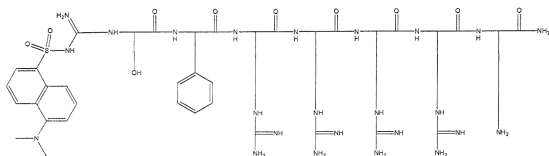




Compound 83

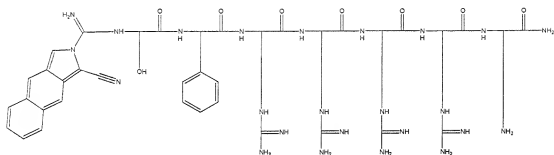


Compound 84

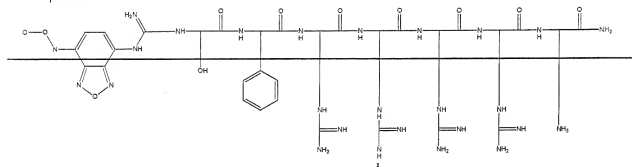


Compound 85

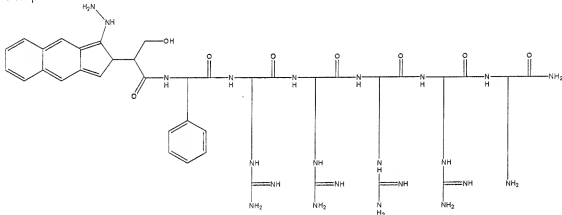
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 42 of 193



Compound 86

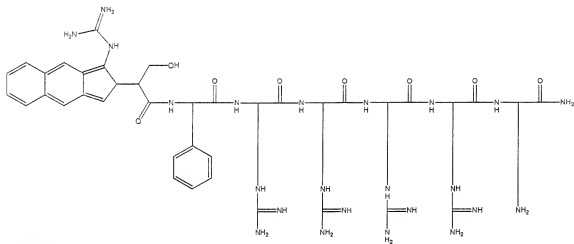


Compound 87

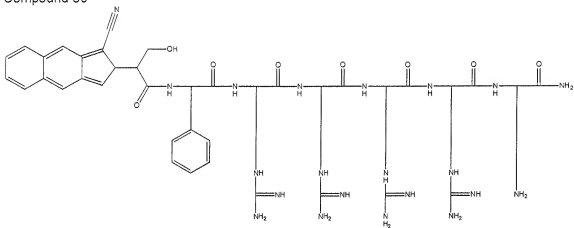


Compound 88

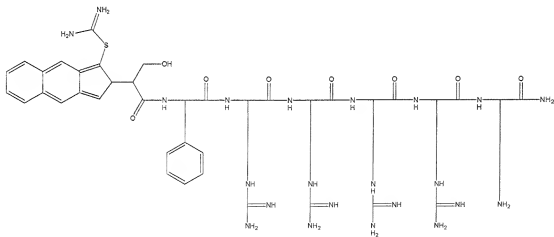
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 43 of 193



Compound 89

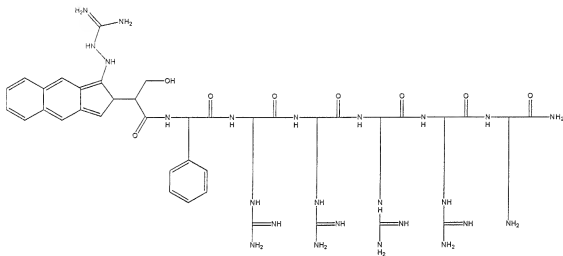


Compound 90

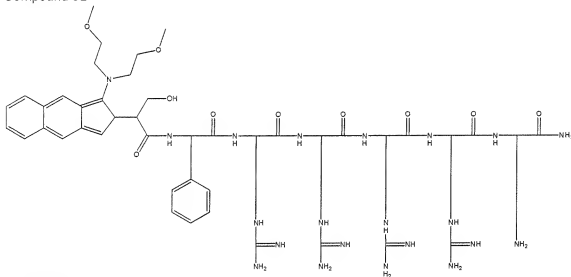


Compound 91

Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 44 of 193

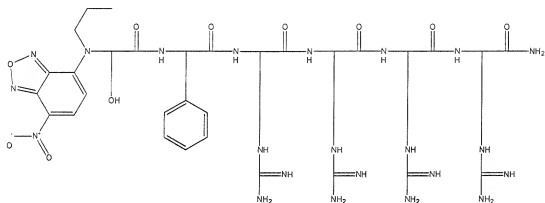


Compound 92

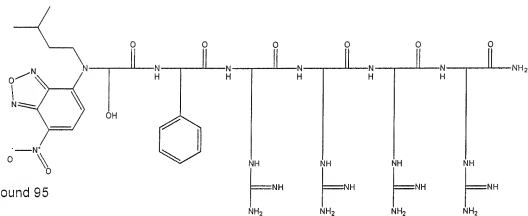


Compound 93

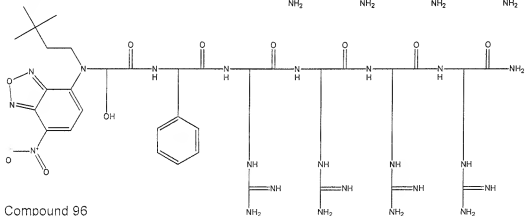
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 45 of 193



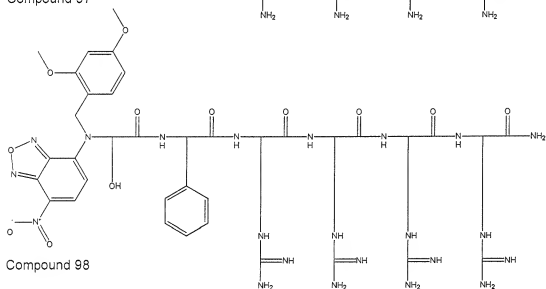
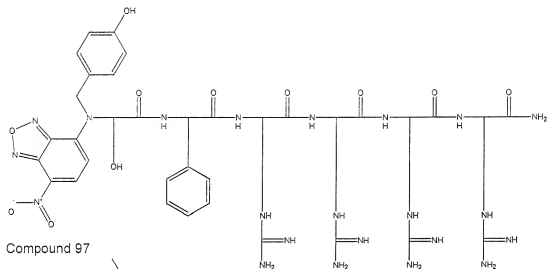
Compound 94



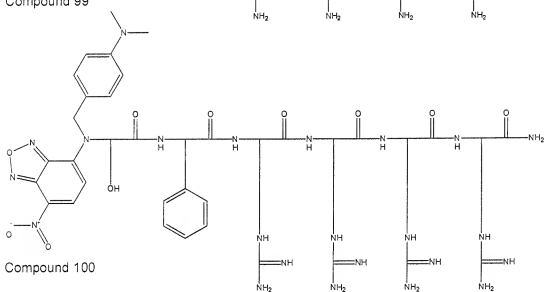
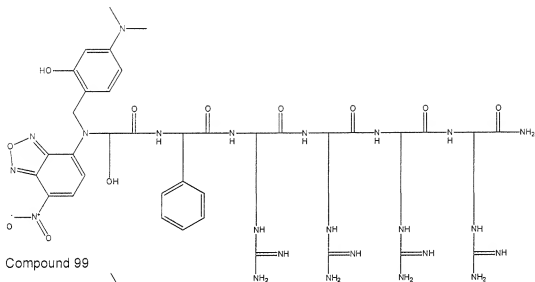
Compound 95

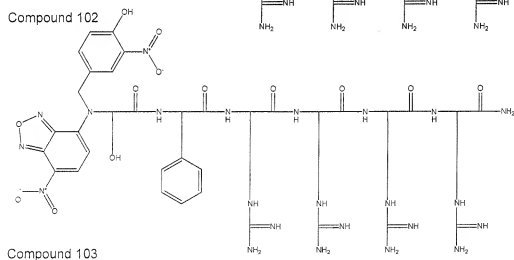
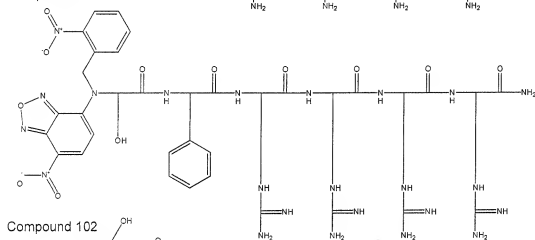
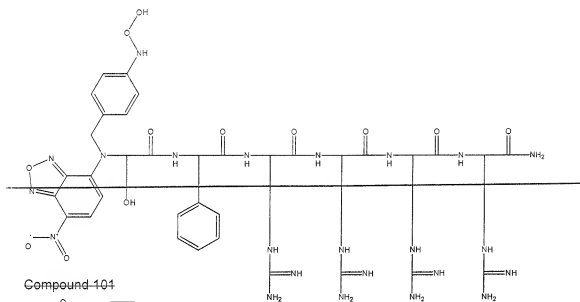


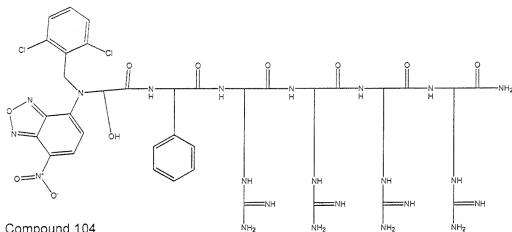
Compound 96



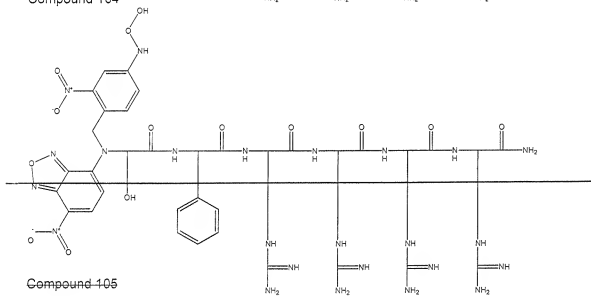
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 47 of 193





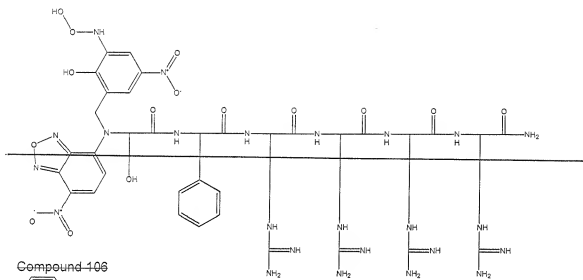


Compound 104

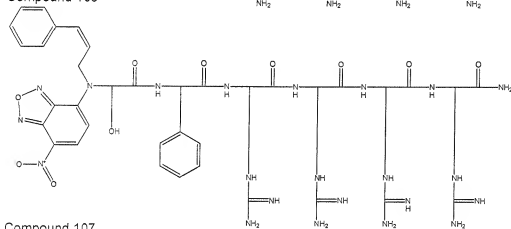


Compound 105

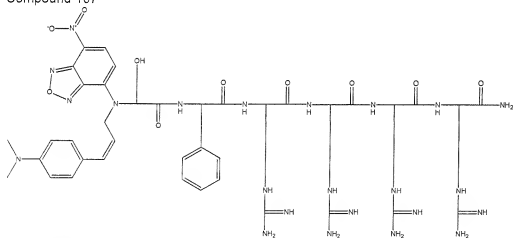
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 50 of 193



Compound 106

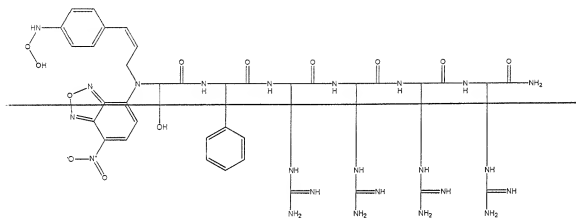


Compound 107

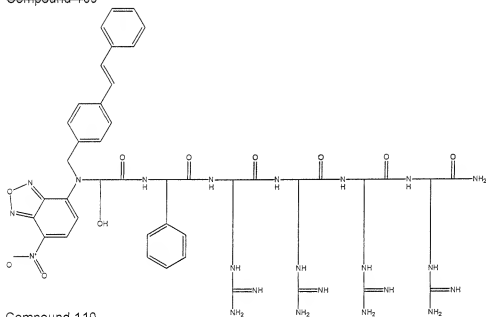


Compound 108

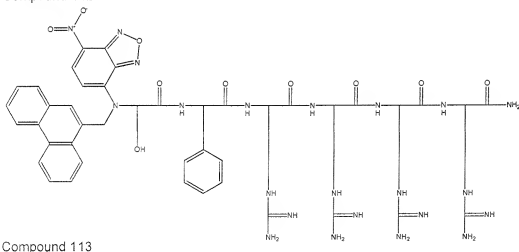
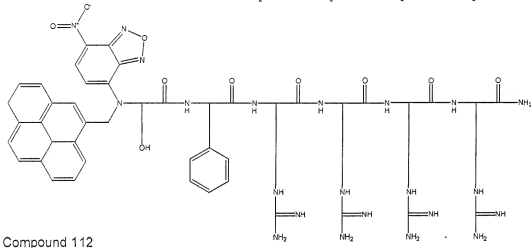
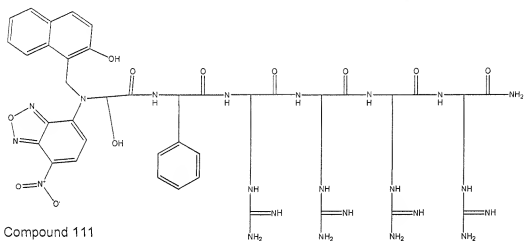
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 51 of 193

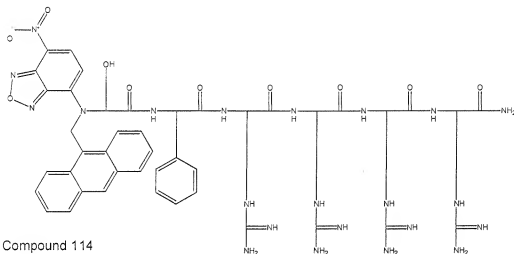


Compound 109

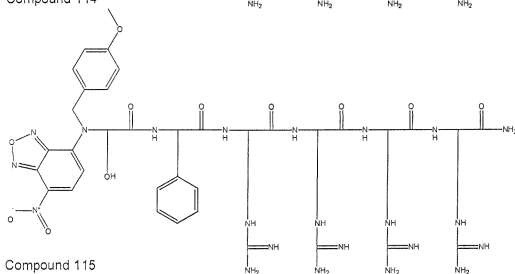


Compound 110

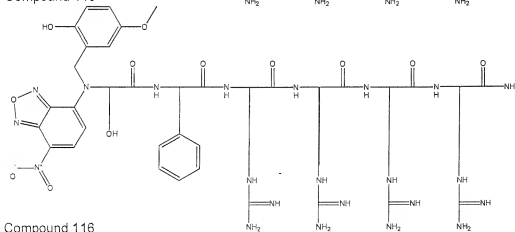




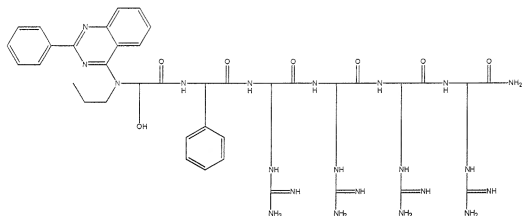
Compound 114



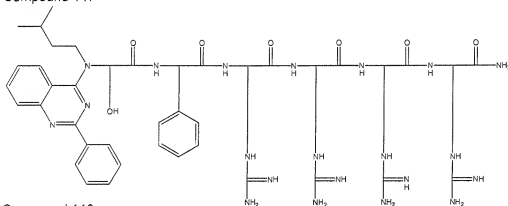
Compound 115



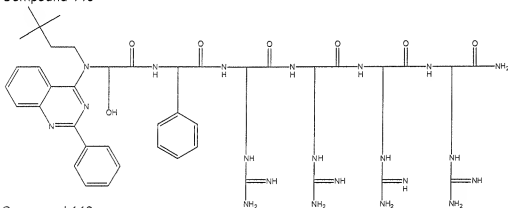
Compound 116



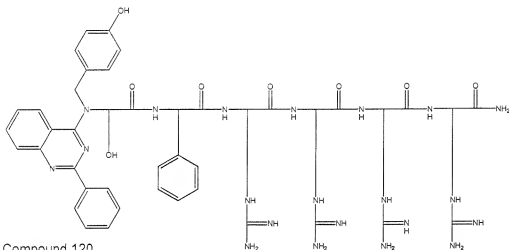
Compound 117



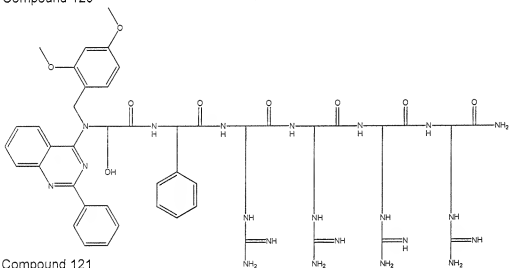
Compound 118



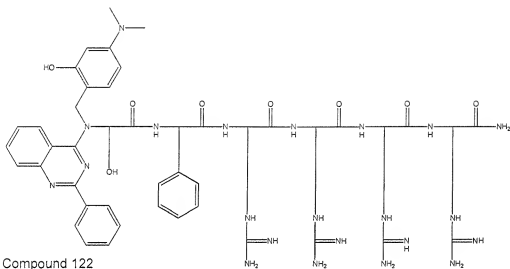
Compound 119



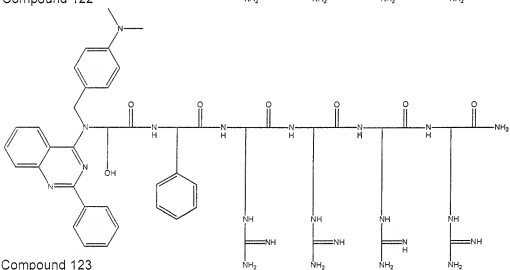
Compound 120



Compound 121



Compound 122

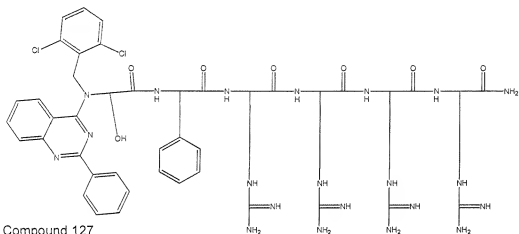


Compound 123

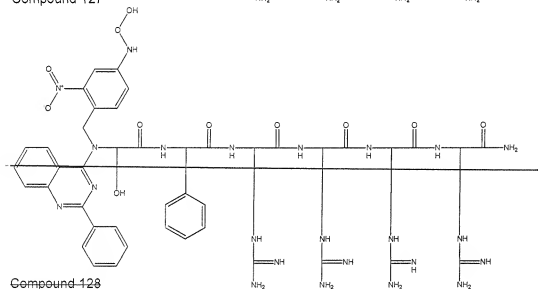
page 57 of 193



Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 58 of 193



Compound 127



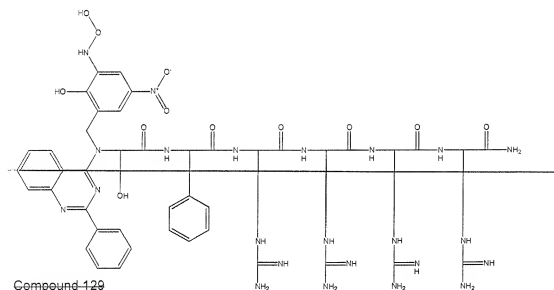
Compound 128

Applicant: David S. Lawrence

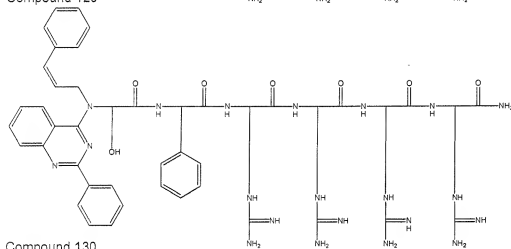
Serial No.: 10/755,086

Filed: January 9, 2004

page 59 of 193

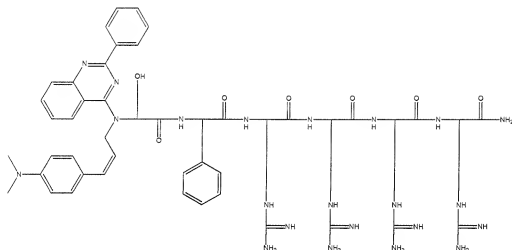


Compound 129

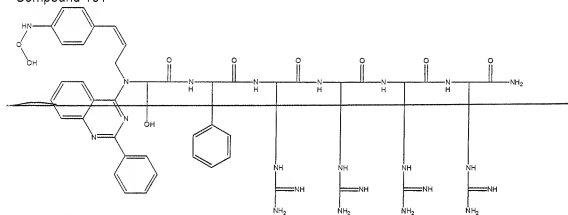


Compound 130

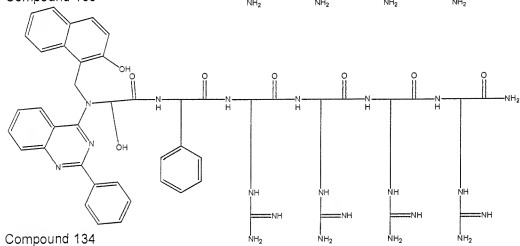
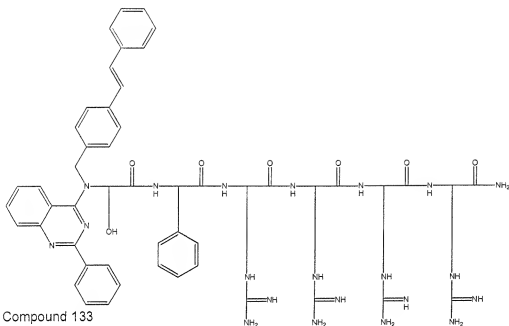
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 60 of 193

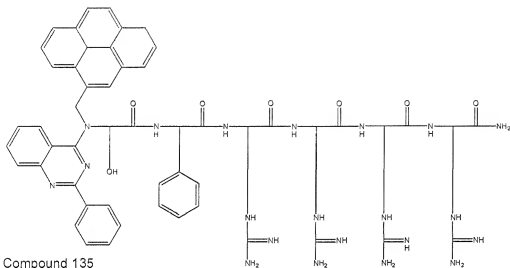


Compound 131

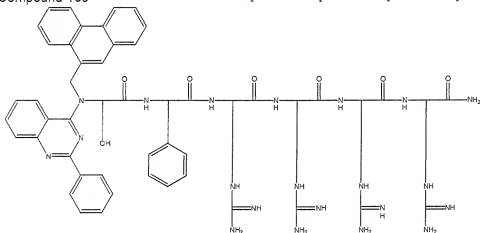


Compound 132

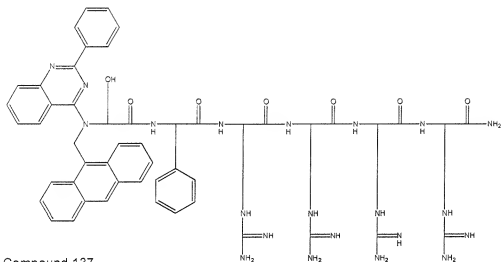




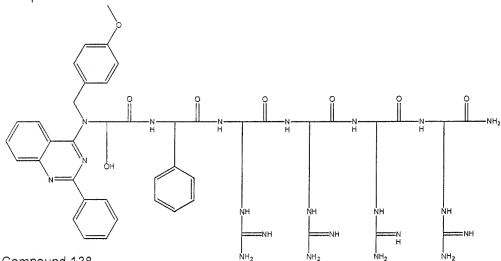
Compound 135



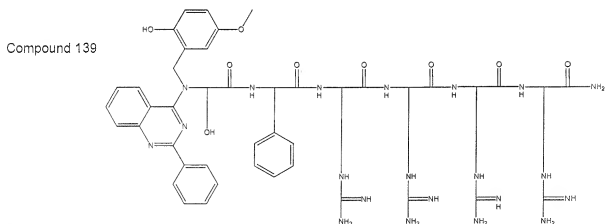
Compound 136



Compound 137

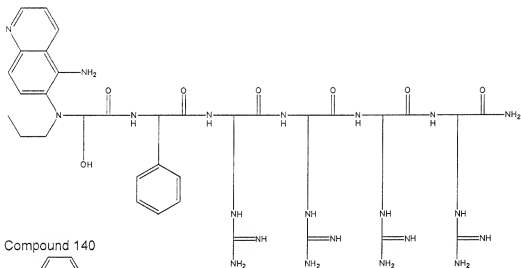


Compound 138

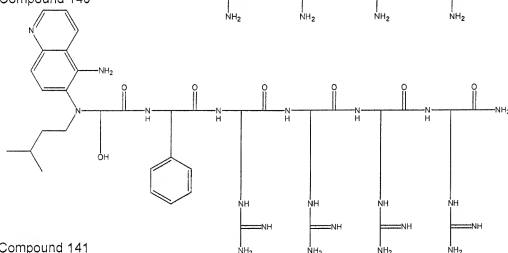


Compound 139

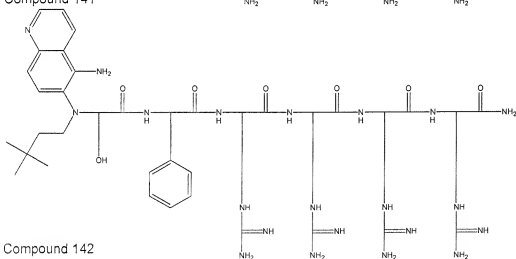
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 64 of 193



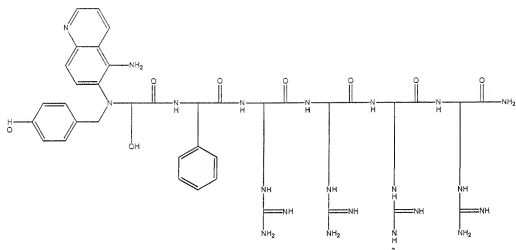
Compound 140



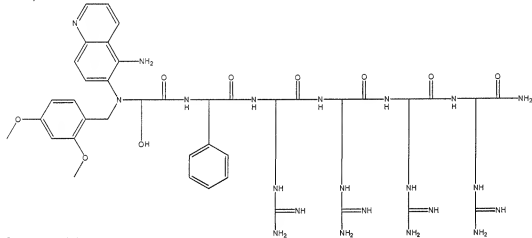
Compound 141



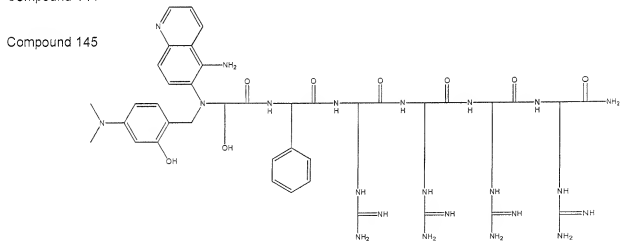
Compound 142



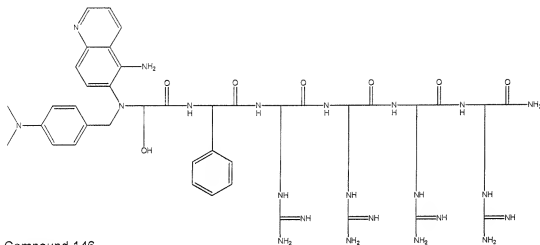
Compound 143



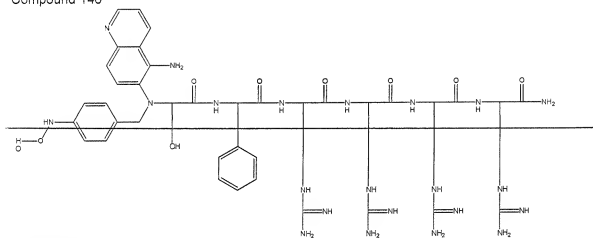
Compound 144



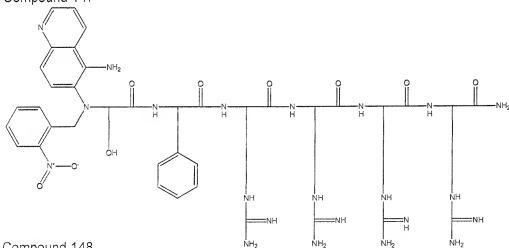
Compound 145



Compound 146

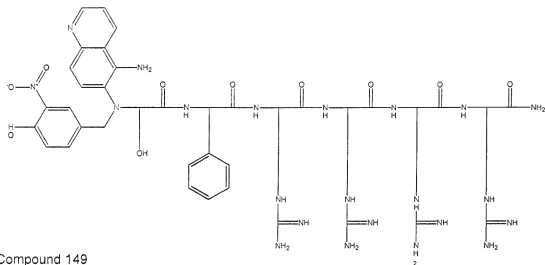


Compound 147

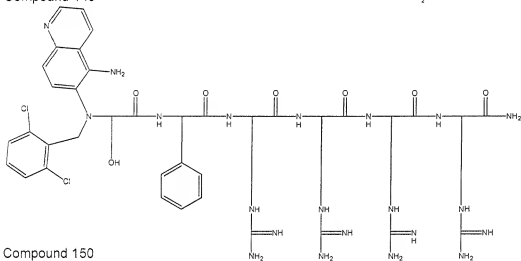


Compound 148

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 67 of 193

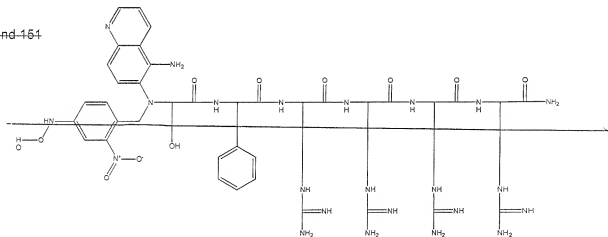


Compound 149

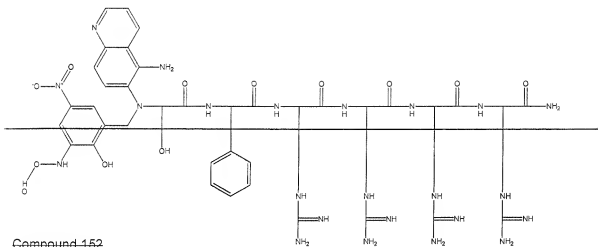


Compound 150

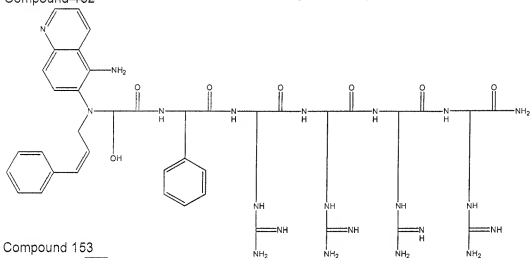
Compound 151



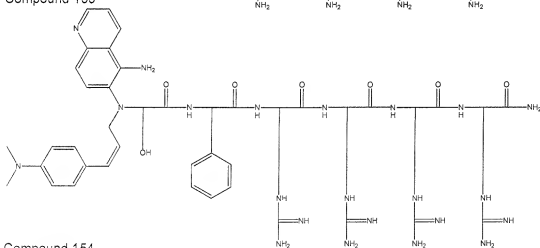
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 68 of 193



Compound 152

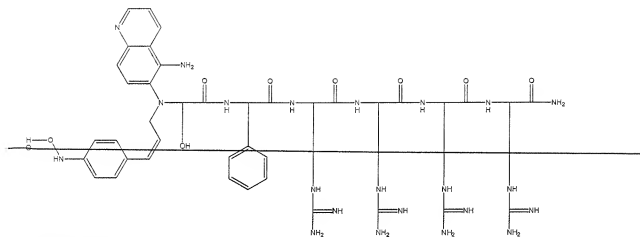


Compound 153

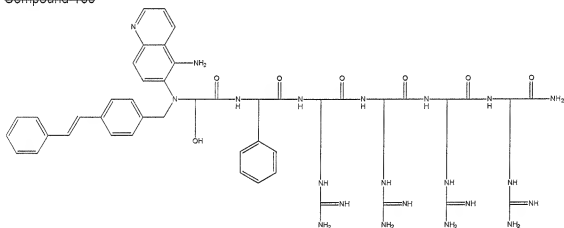


Compound 154

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 69 of 193

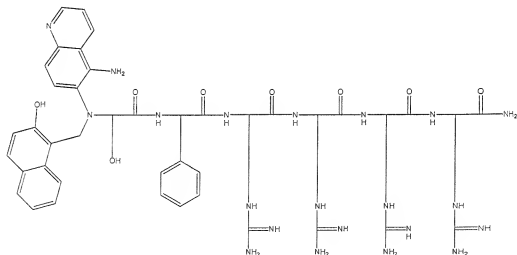


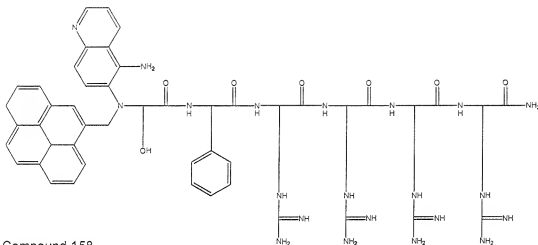
Compound 155



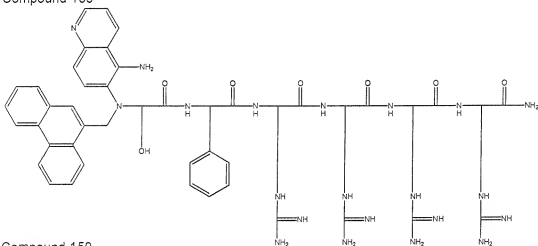
Compound 156

Compound 157

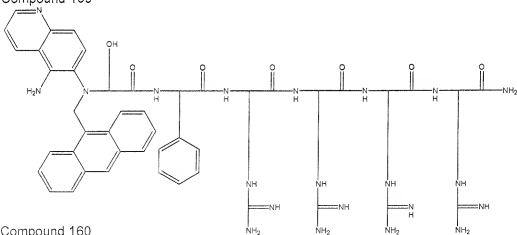




Compound 158

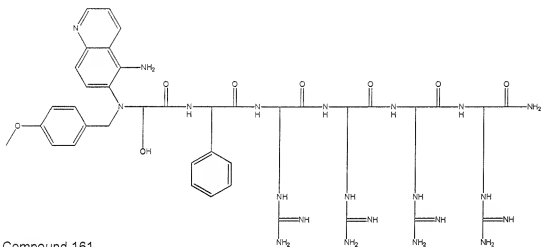


Compound 159

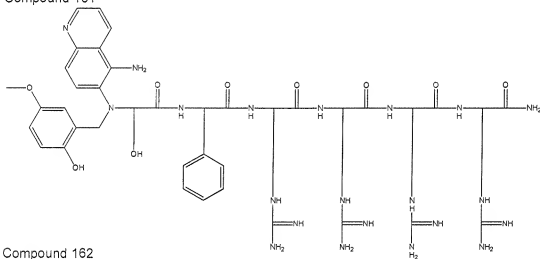


Compound 160

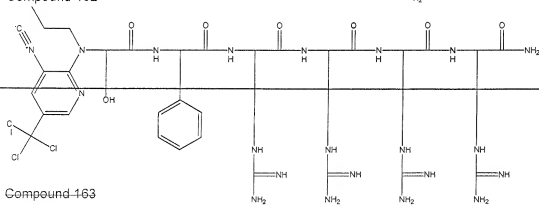
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 71 of 193



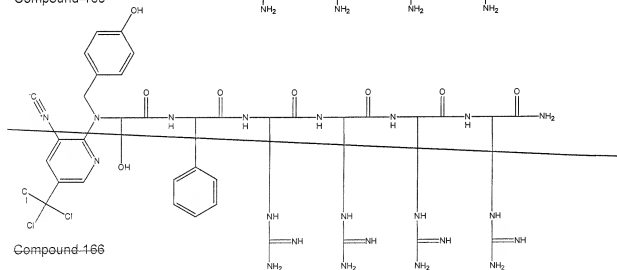
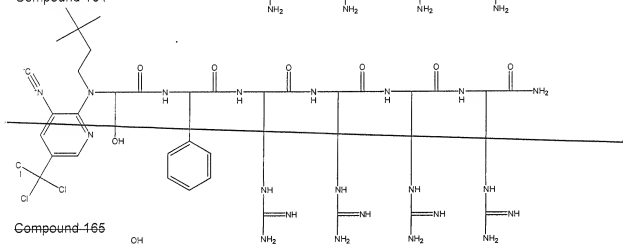
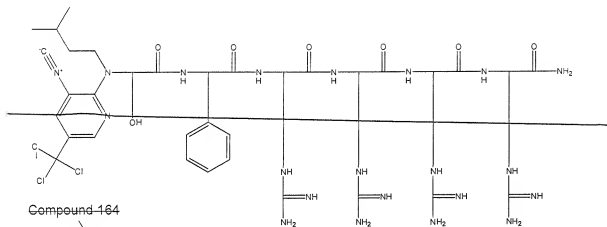
Compound 161



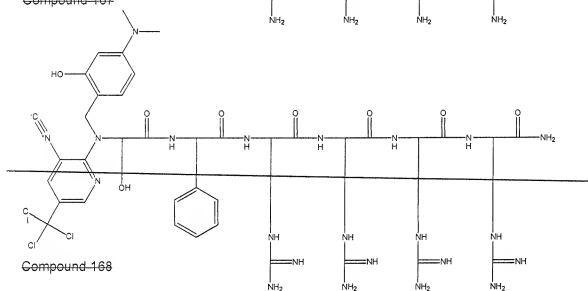
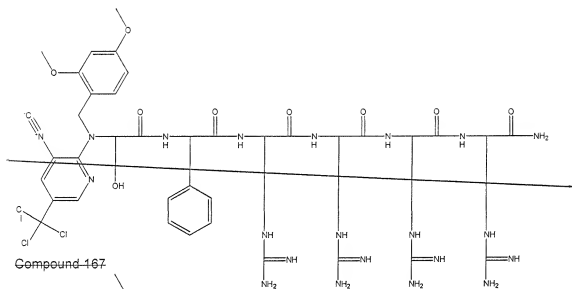
Compound 162



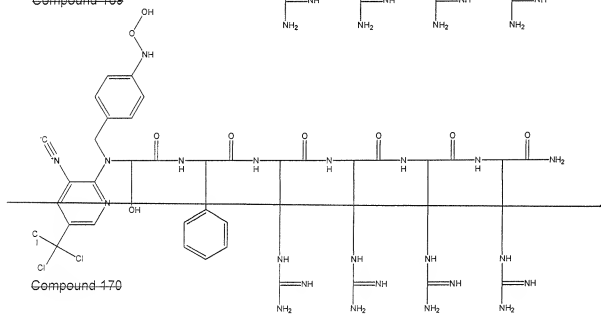
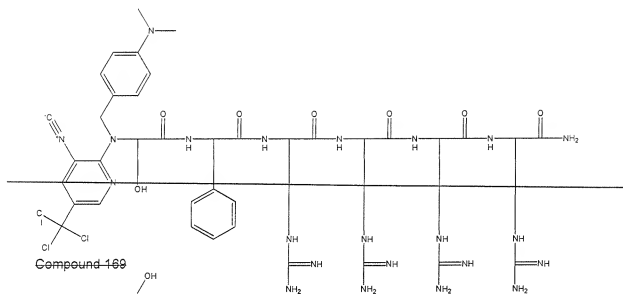
Compound 163



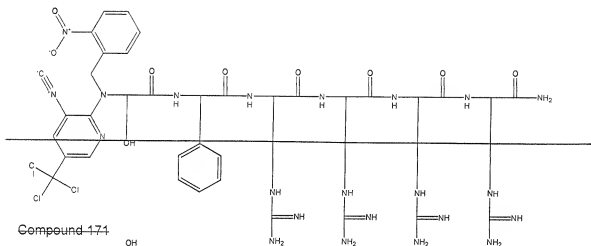
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 73 of 193



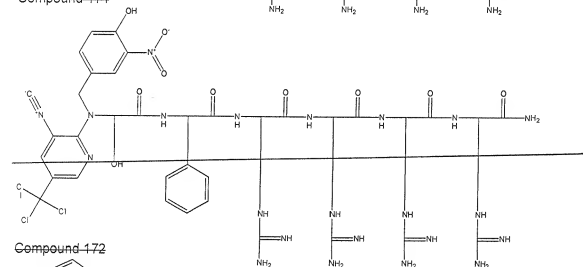
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 74 of 193



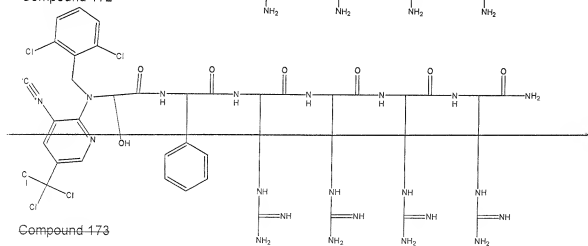
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 75 of 193



Compound 174



Compound 172

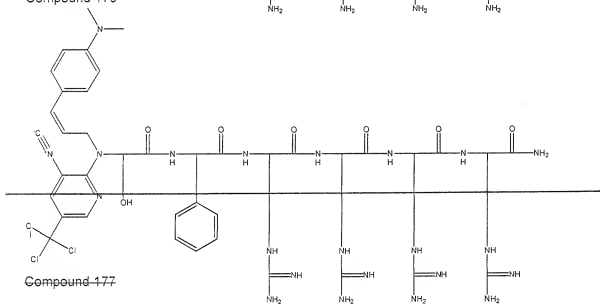
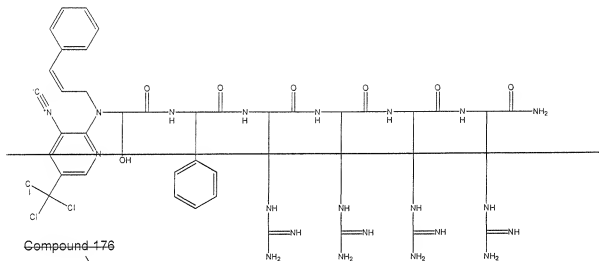


Compound 173

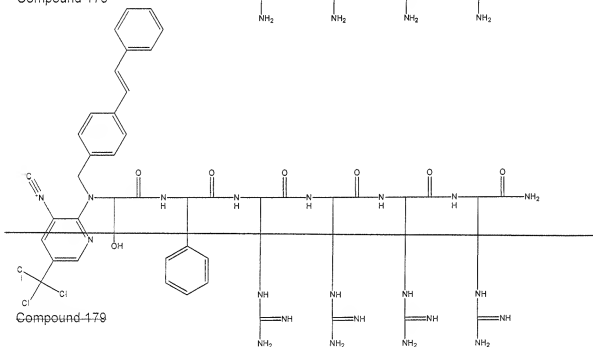
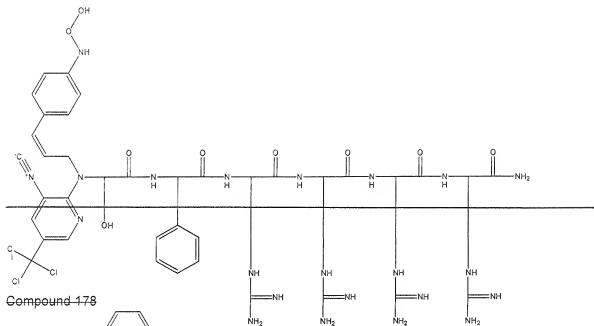
page 76 of 193



Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 77 of 193

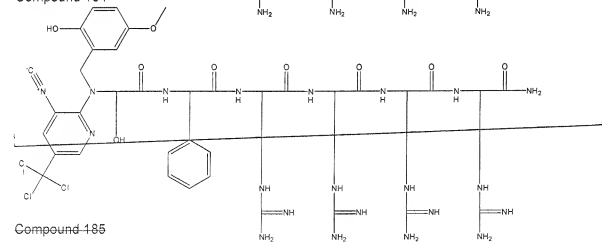
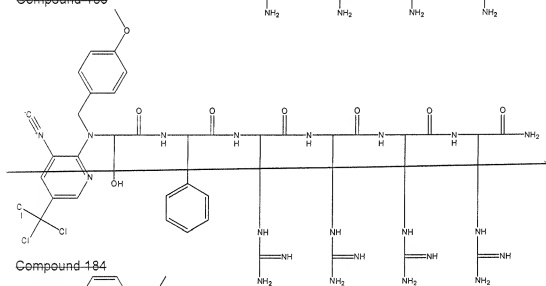
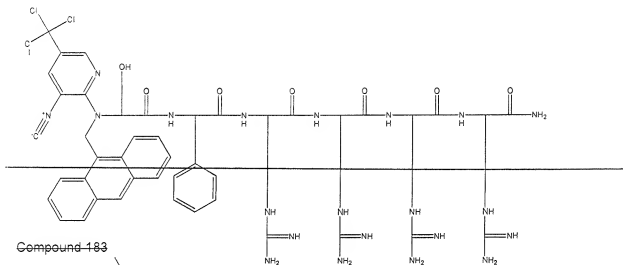


Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 78 of 193

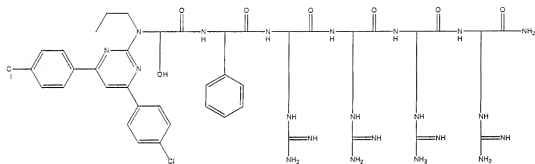


page 79 of 193

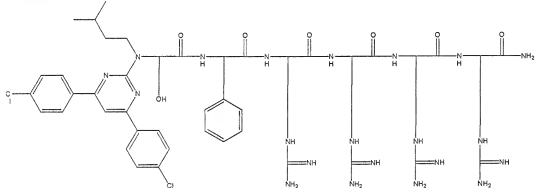




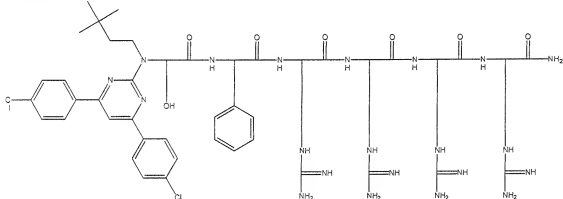
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 81 of 193



Compound 186



Compound 187



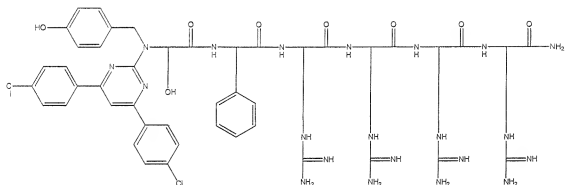
Compound 188

Applicant: David S. Lawrence

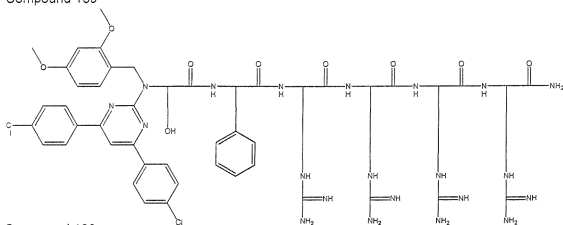
Serial No.: 10/755,086

Filed: January 9, 2004

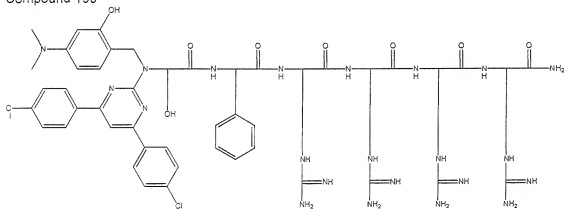
page 82 of 193



Compound 189



Compound 190



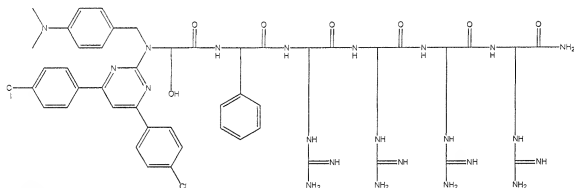
Compound 191

Applicant: David S. Lawrence

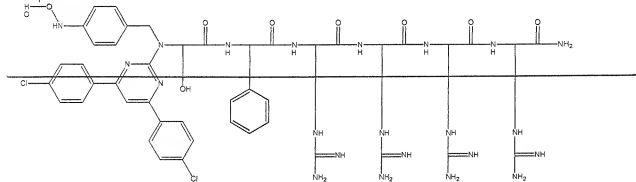
Serial No.: 10/755,086

Filed: January 9, 2004

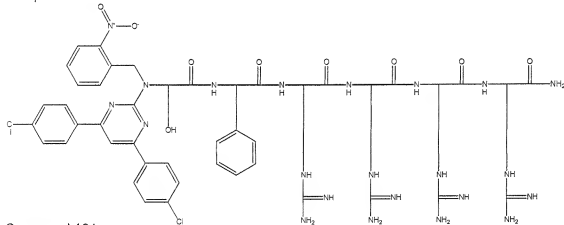
page 83 of 193



Compound 192

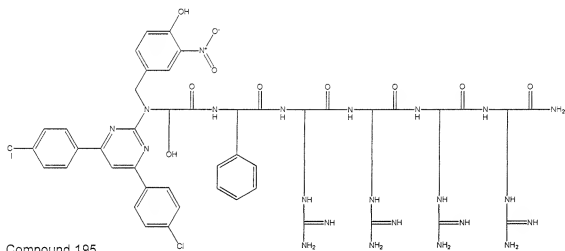


Compound 193

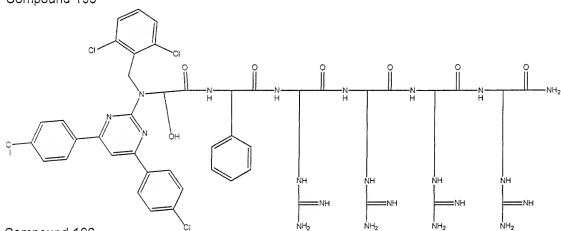


Compound 194

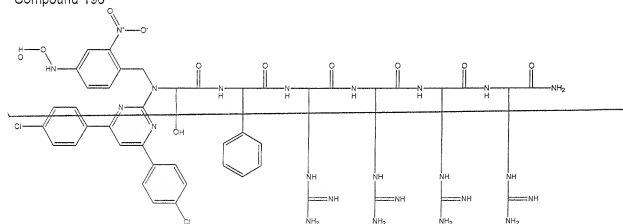
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 84 of 193



Compound 195

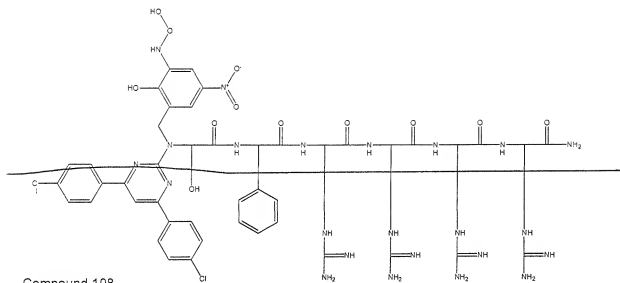


Compound 196

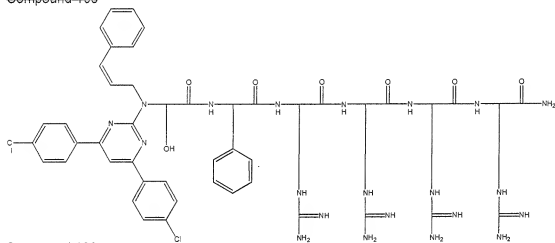


Compound 197

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 85 of 193

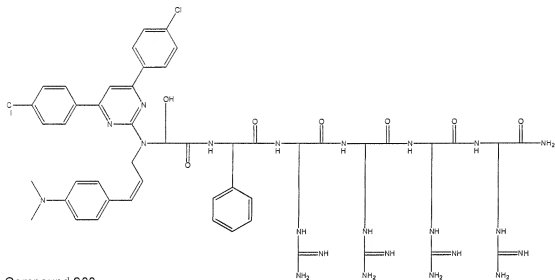


Compound 198

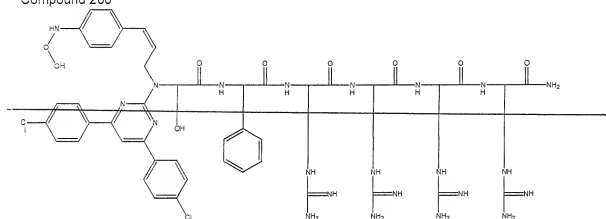


Compound 199

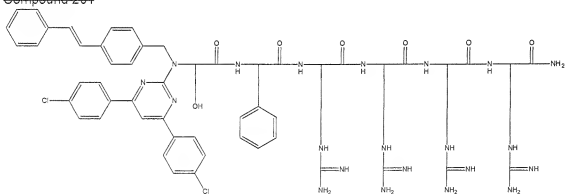
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 86 of 193



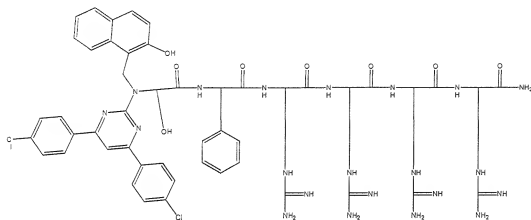
Compound 200



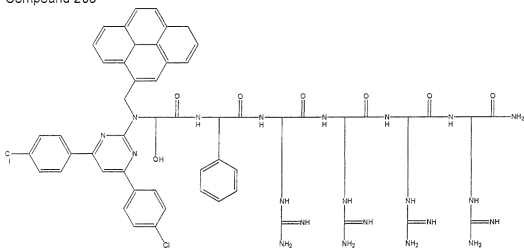
Compound 201



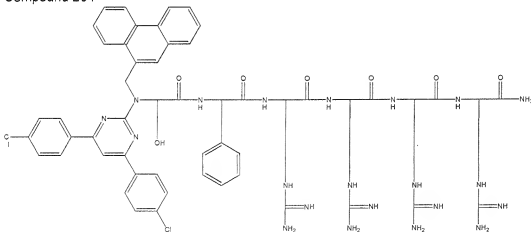
Compound 202



Compound 203

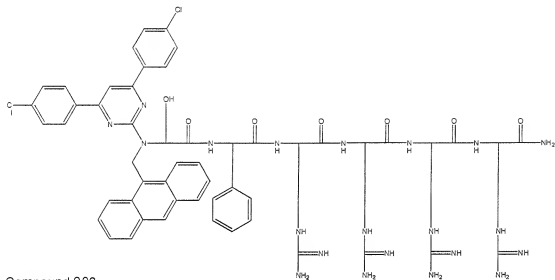


Compound 204

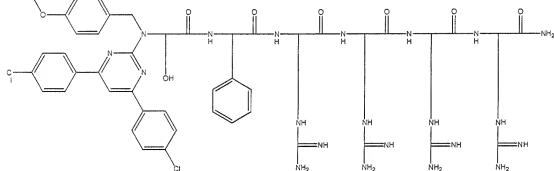


Compound 205

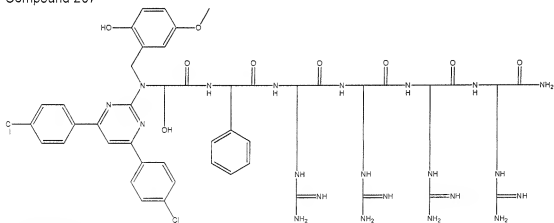
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 88 of 193



Compound 206



Compound 207



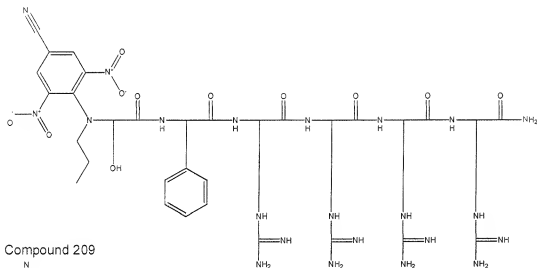
Compound 208

Applicant: David S. Lawrence

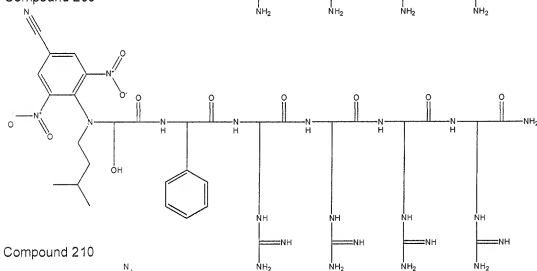
Serial No.: 10/755,086

Filed: January 9, 2004

page 89 of 193

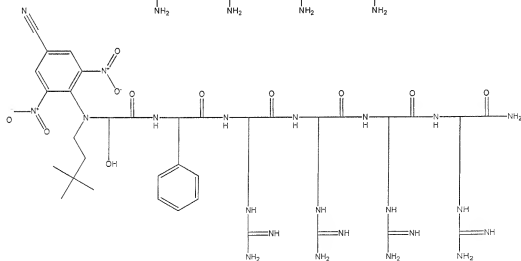


Compound 209

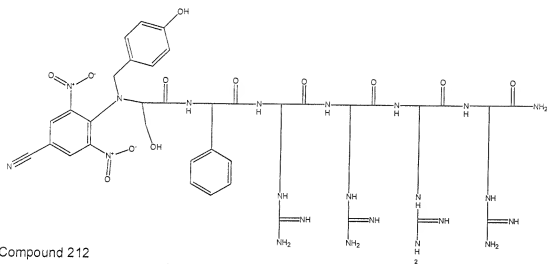


Compound 210

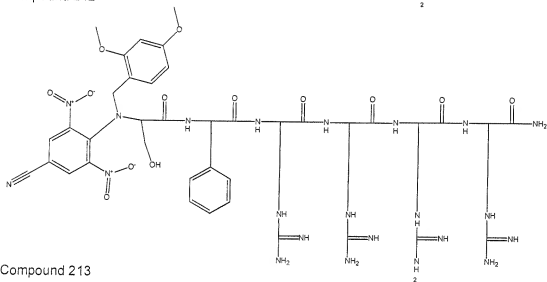
Compound 211



Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 90 of 193

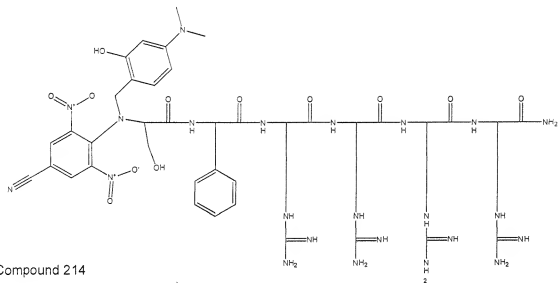


Compound 212

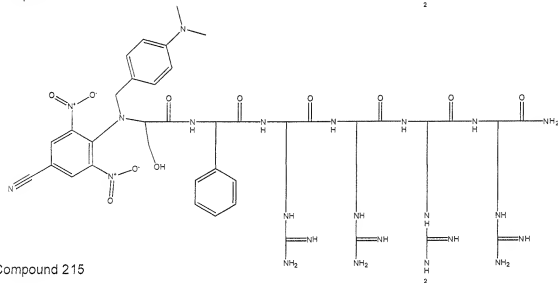


Compound 213

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 91 of 193

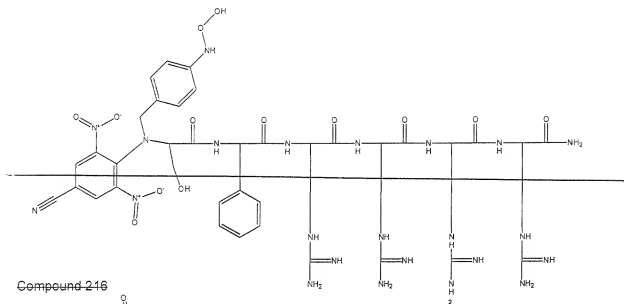


Compound 214

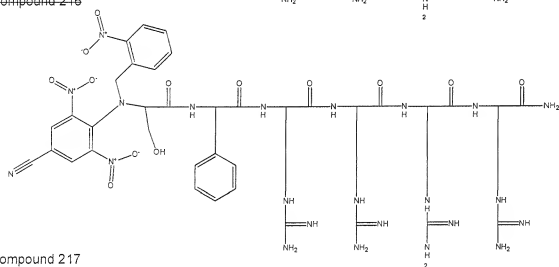


Compound 215

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 92 of 193

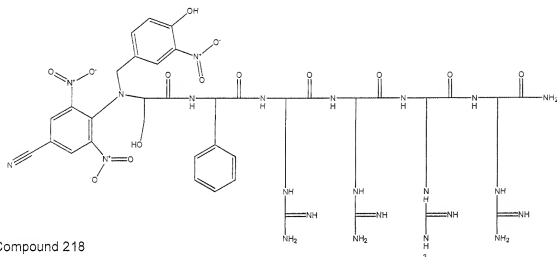


Compound 216

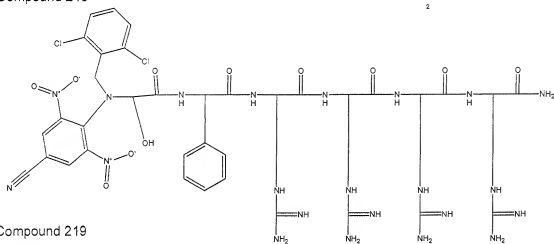


Compound 217

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 93 of 193

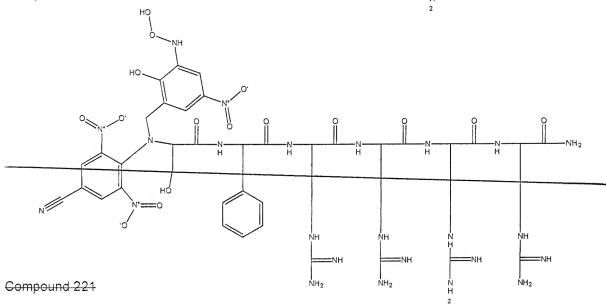
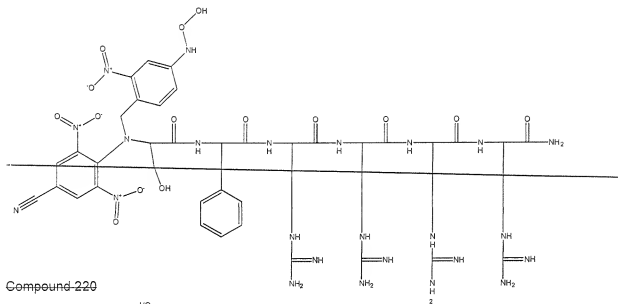


Compound 218

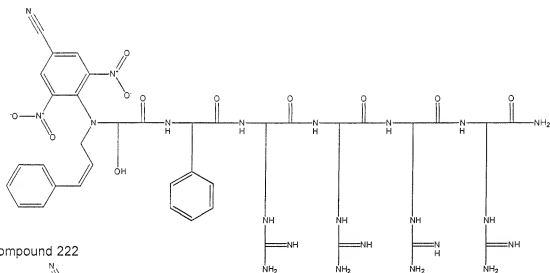


Compound 219

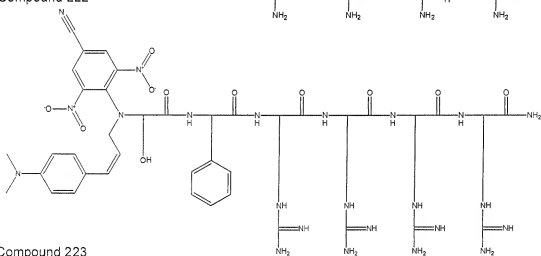
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 94 of 193



Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 95 of 193

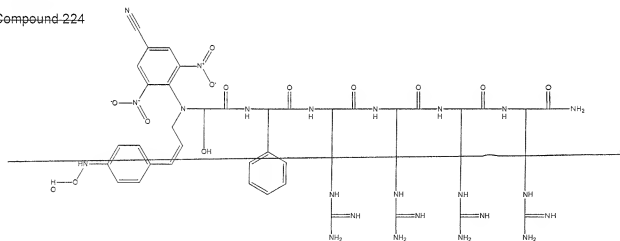


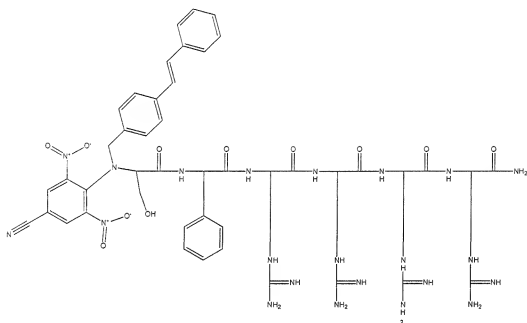
Compound 222



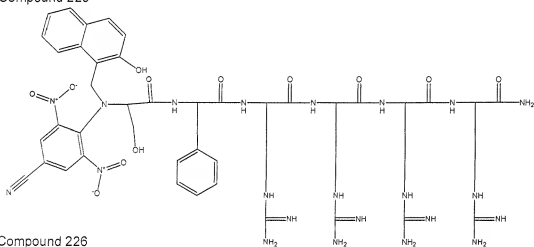
Compound 223

Compound 224



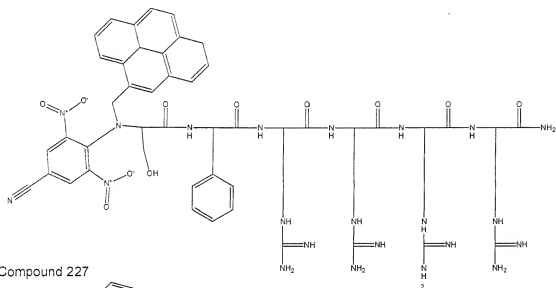


Compound 225

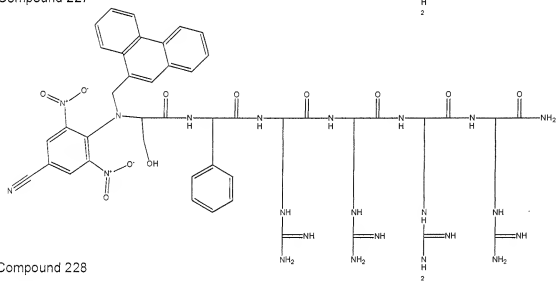


Compound 226

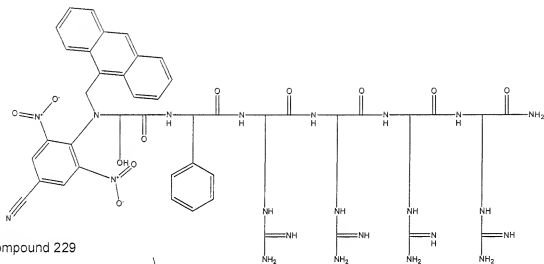
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 97 of 193



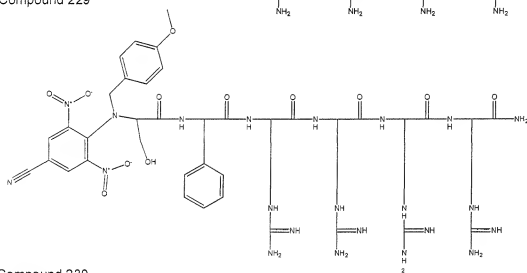
Compound 227



Compound 228

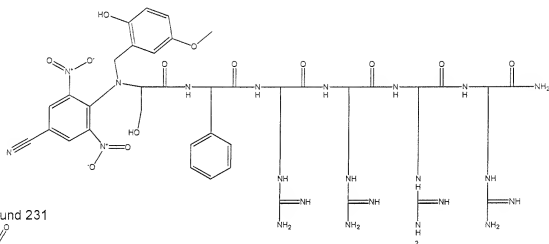


Compound 229

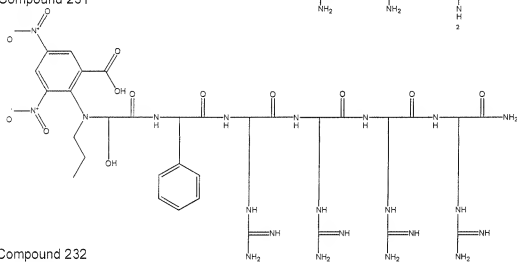


Compound 230

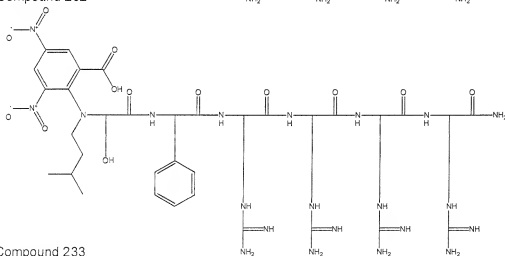
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 99 of 193



Compound 231

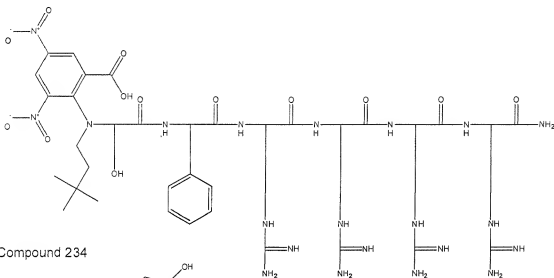


Compound 232

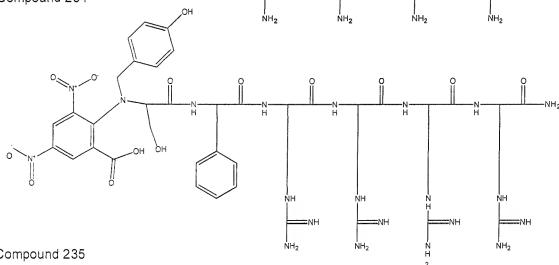


Compound 233

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 100 of 193

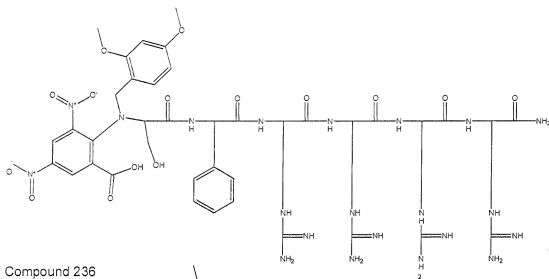


Compound 234

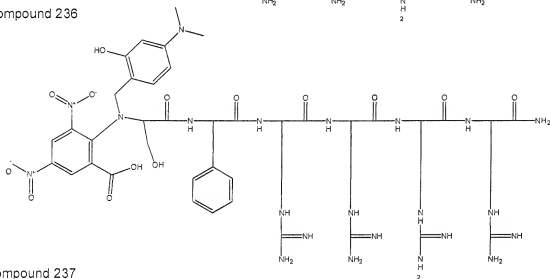


Compound 235

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 101 of 193

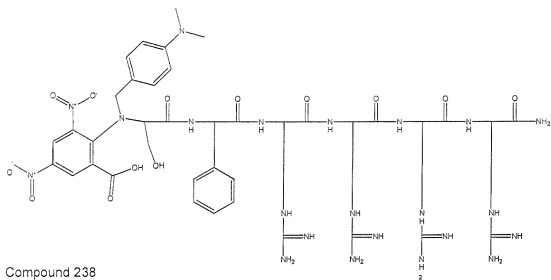


Compound 236

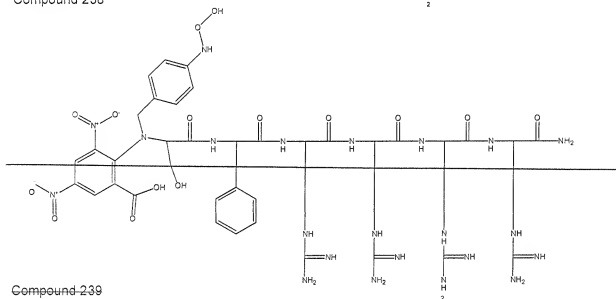


Compound 237

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 102 of 193

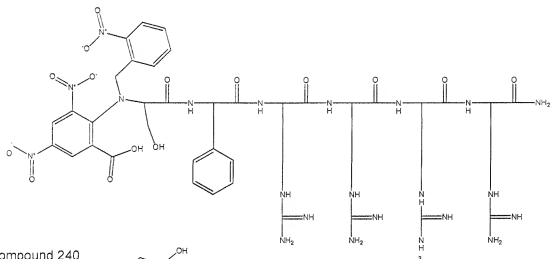


Compound 238

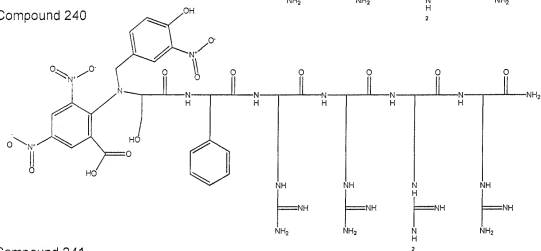


Compound 239

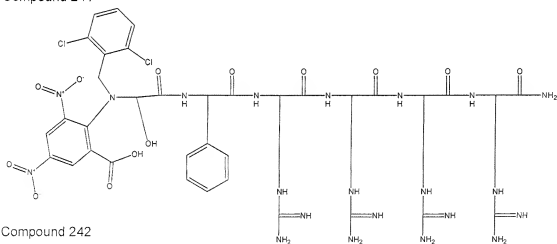
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 103 of 193



Compound 240



Compound 241

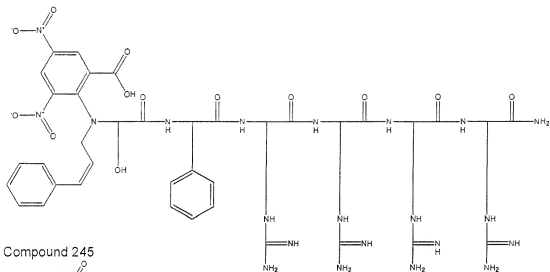


Compound 242

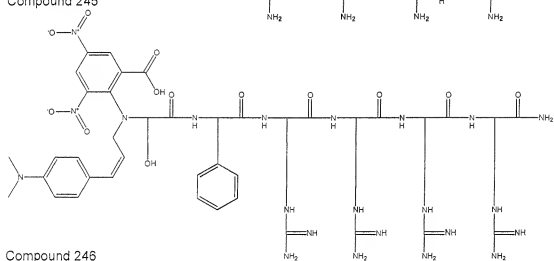
page 104 of 193



Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 105 of 193

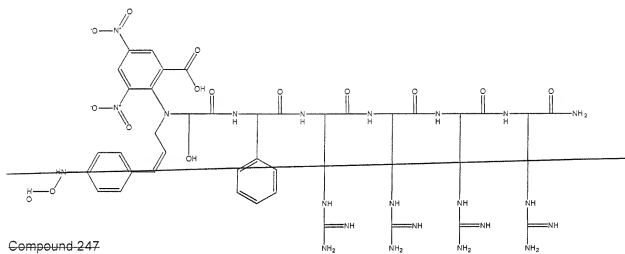


Compound 245

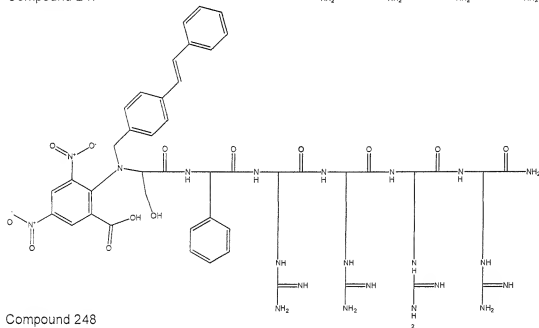


Compound 246

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 106 of 193

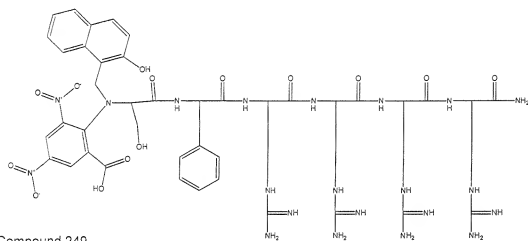


Compound 247

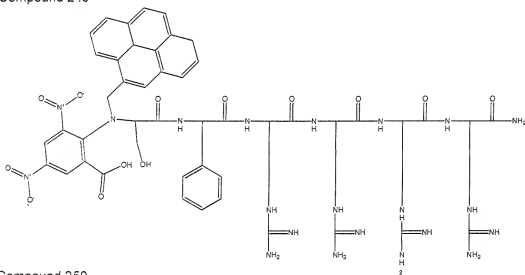


Compound 248

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 107 of 193

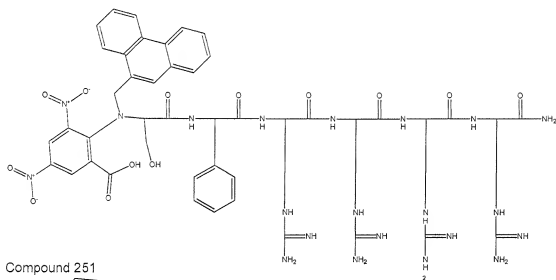


Compound 249

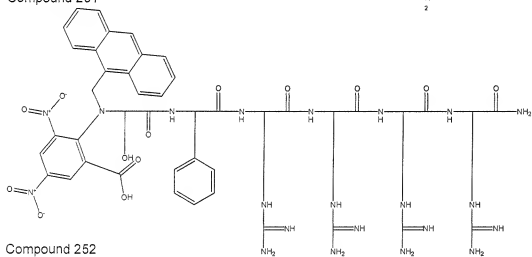


Compound 250

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 108 of 193

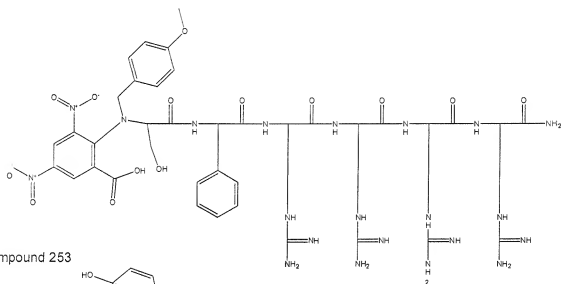


Compound 251

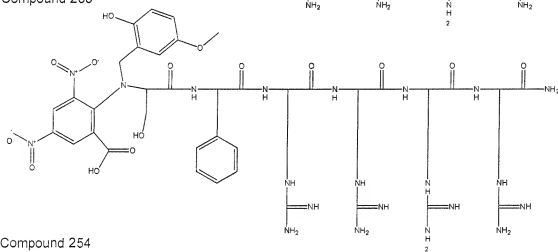


Compound 252

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 109 of 193

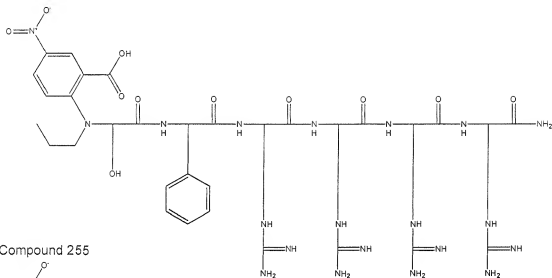


Compound 253

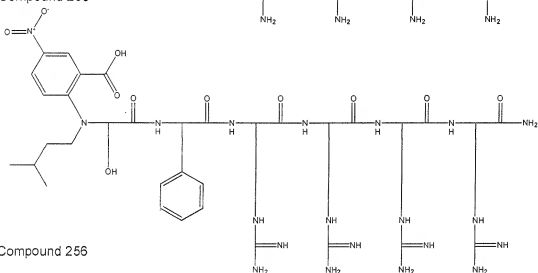


Compound 254

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 110 of 193

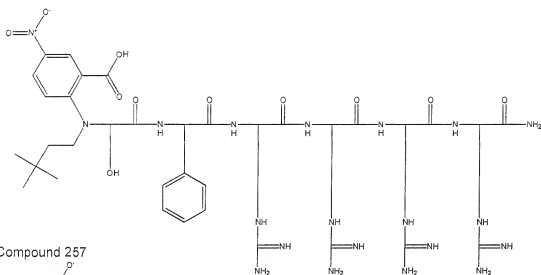


Compound 255

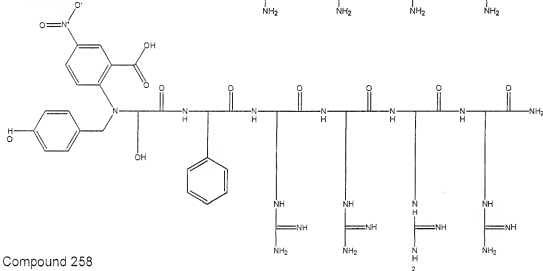


Compound 256

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 111 of 193

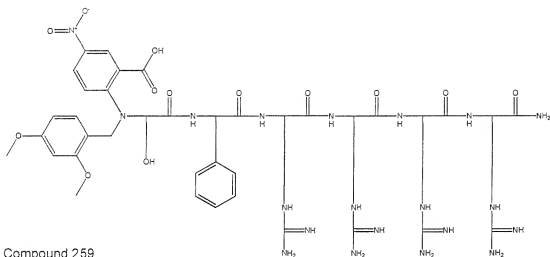


Compound 257

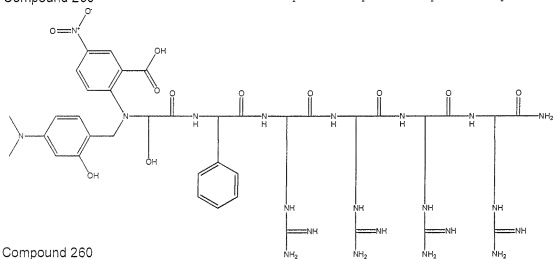


Compound 258

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 112 of 193

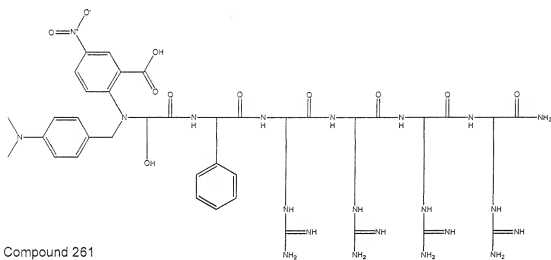


Compound 259

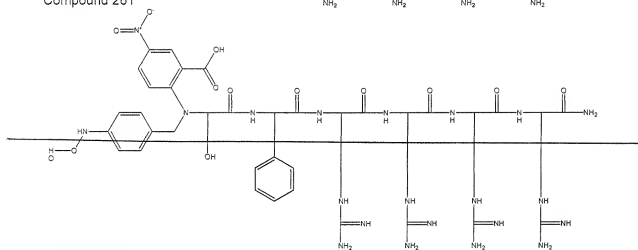


Compound 260

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 113 of 193

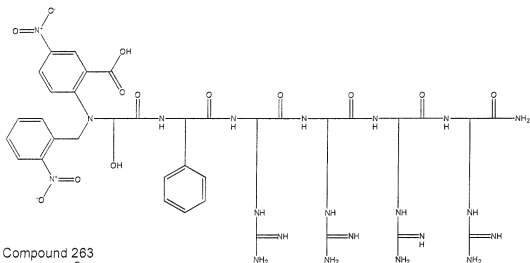


Compound 261

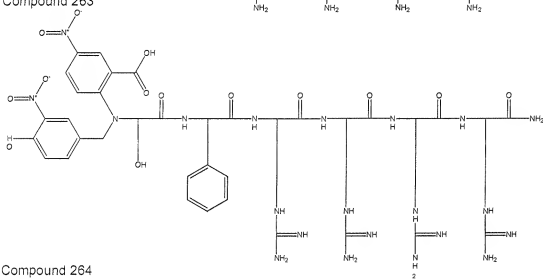


Compound 262

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 114 of 193

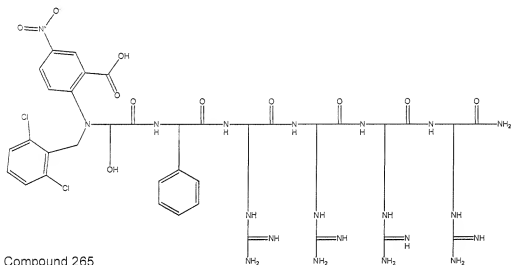


Compound 263

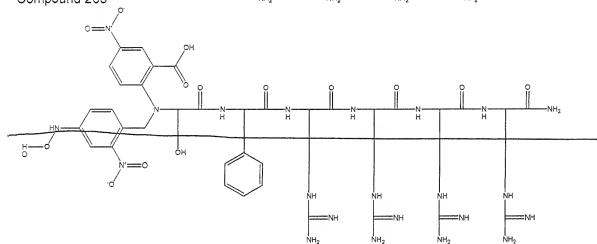


Compound 264

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 115 of 193



Compound 265



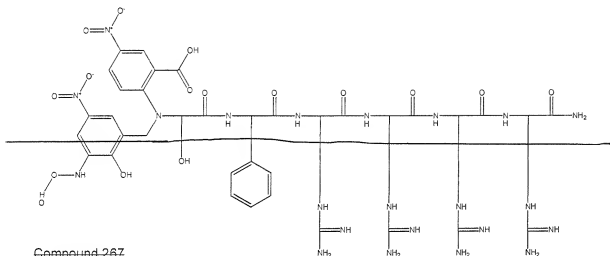
Compound 266

Applicant: David S. Lawrence

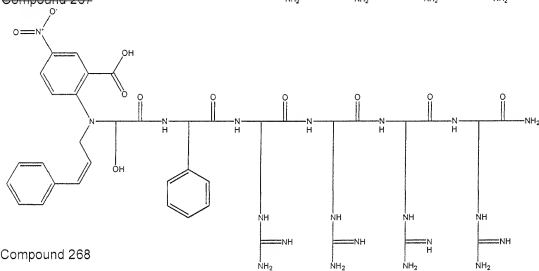
Serial No.: 10/755,086

Filed: January 9, 2004

page 116 of 193

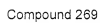


Compound 267

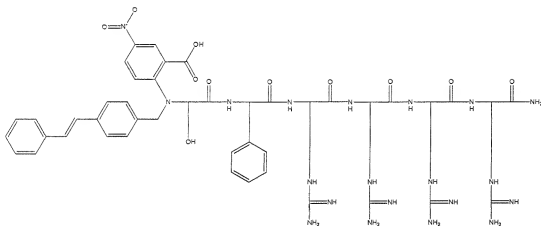


Compound 268

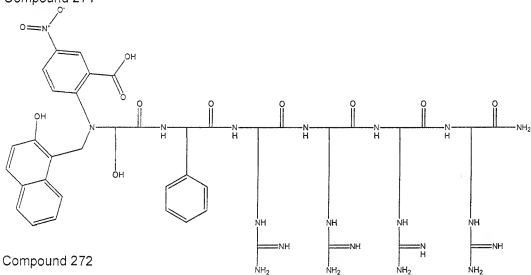
446510 1



Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 118 of 193

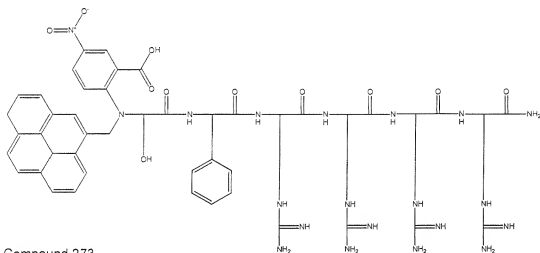


Compound 271

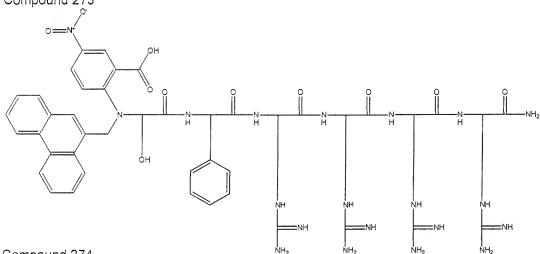


Compound 272

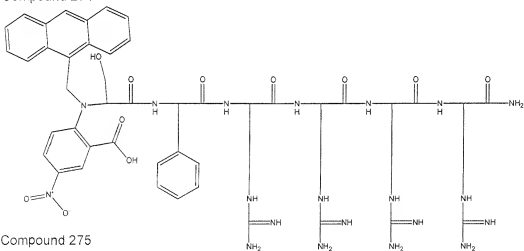
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 119 of 193



Compound 273

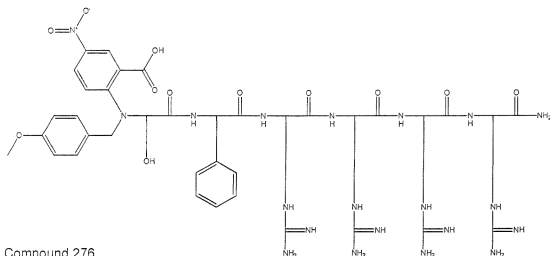


Compound 274




Compound 275

page 120 of 193



Compound 277



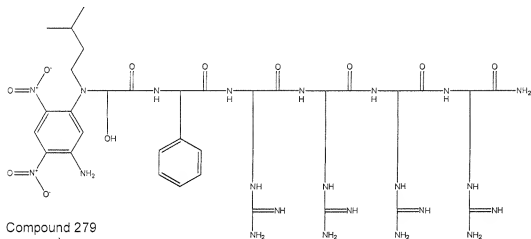
Chemical structure of Compound 277: A complex molecule featuring a central benzene ring substituted with a nitro group (NO₂), a carboxylic acid group (COOH), and a side chain containing a methoxy group (OMe), a hydroxyl group (OH), and a nitrogen atom. This side chain is linked via an amide bond to a long chain of repeating amide units, which terminates in a primary amine group (NH₂). The repeating units are connected by amide bonds, and the terminal unit is a primary amine.

Compound 277

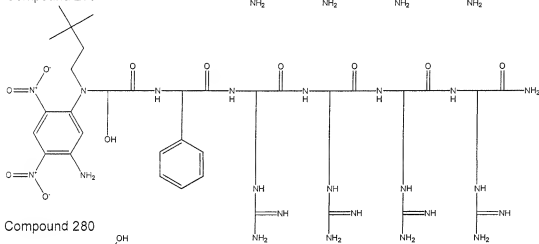
Chemical structure of Compound 278, a linear peptide derivative. The structure features a 2,6-dinitrophenyl group attached to the N-terminus of a peptide chain. The peptide backbone consists of a series of amide bonds. The side chains include a hydroxyl group, a phenyl group, and three terminal amide groups (NH₂). The structure is shown in a simplified representation with vertical lines for the peptide backbone and horizontal lines for the side chains.

Compound 278

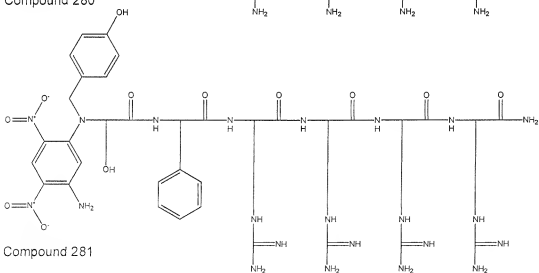
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 121 of 193



Compound 279



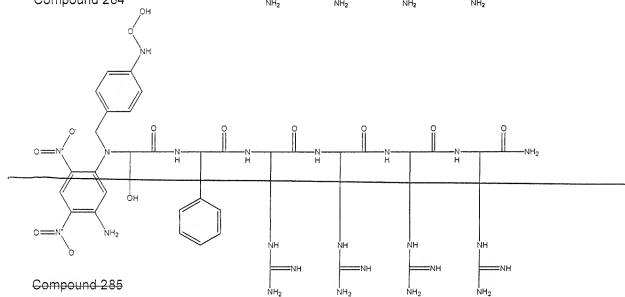
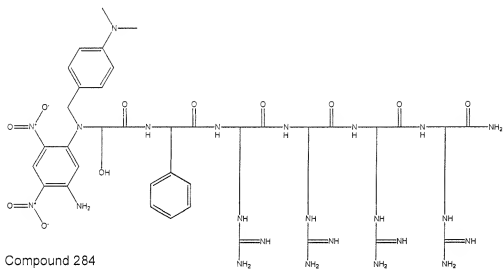
Compound 280

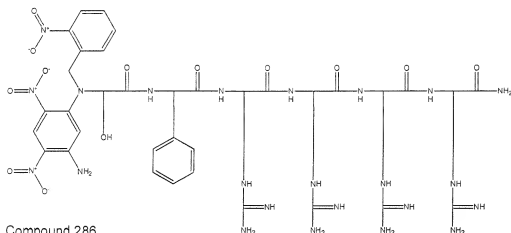


Compound 281

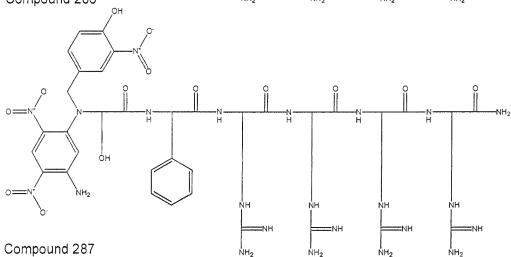
page 122 of 193



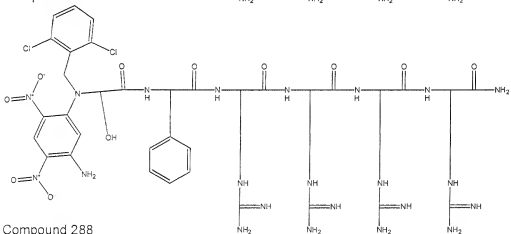




Compound 286

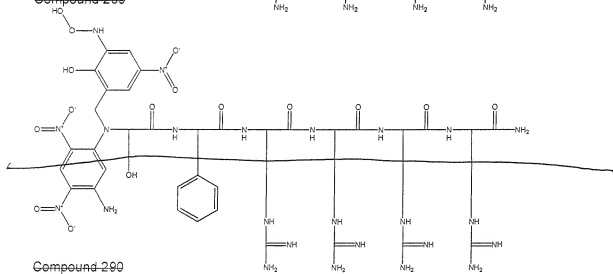
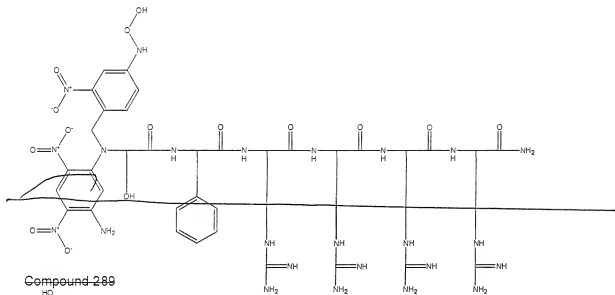


Compound 287

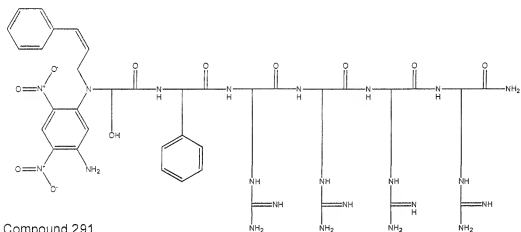


Compound 288

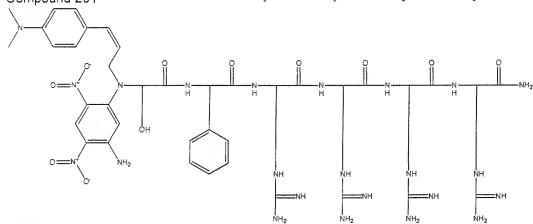
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 125 of 193



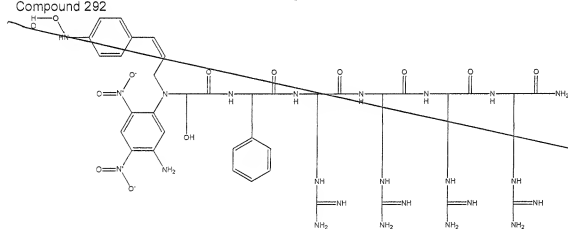
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 126 of 193



Compound 291

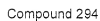


Compound 292

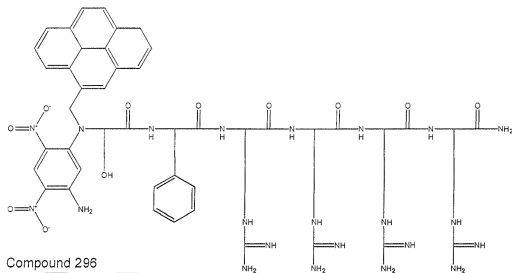


Compound 293

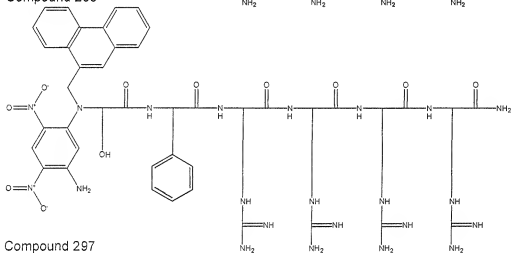
page 127 of 193



Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 128 of 193

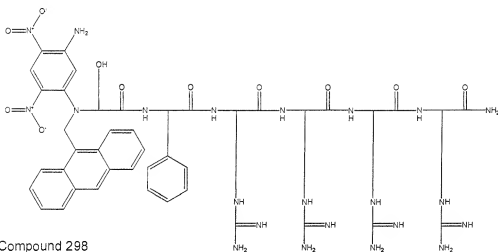


Compound 296

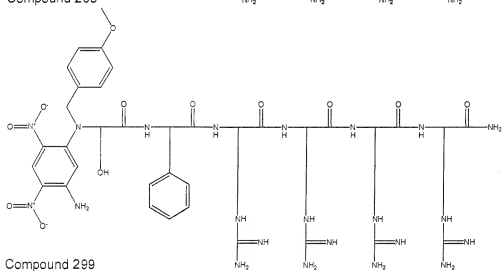


Compound 297

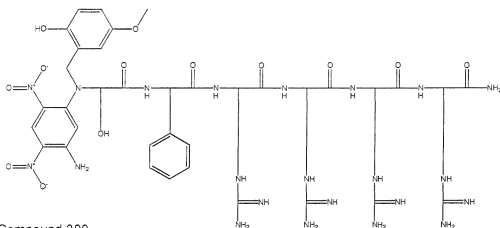
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 129 of 193



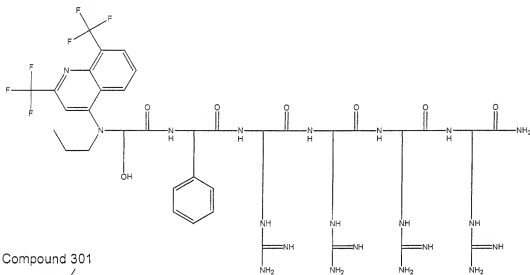
Compound 298



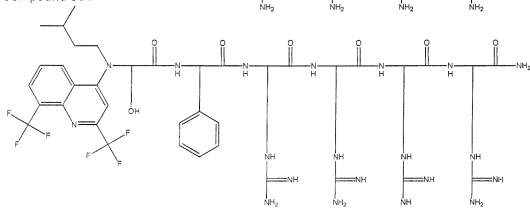
Compound 299



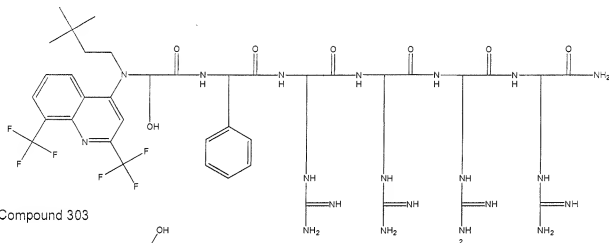
Compound 300



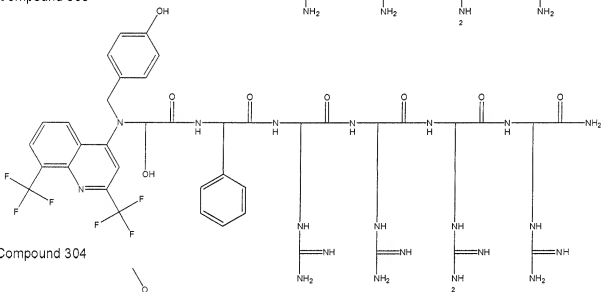
Compound 301



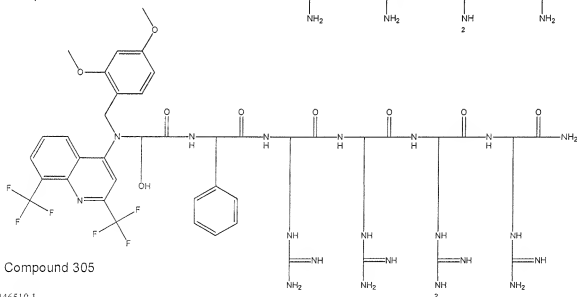
Compound 302



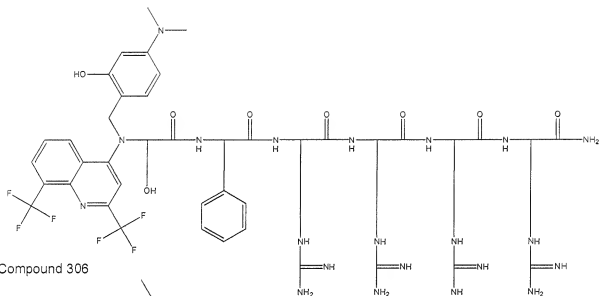
Compound 303



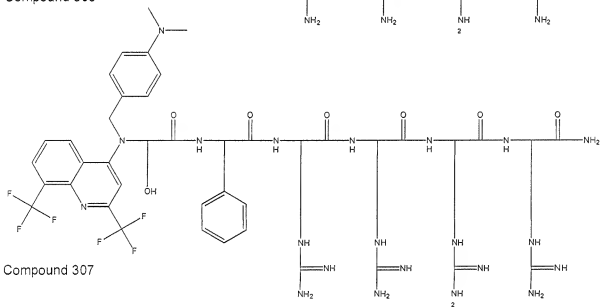
Compound 304



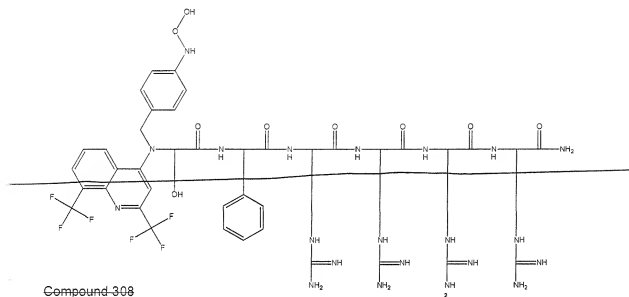
Compound 305



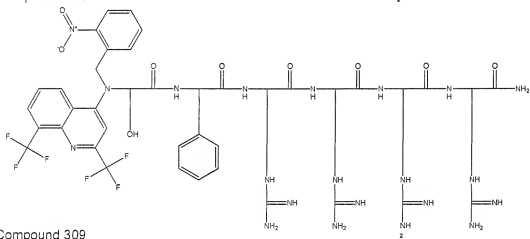
Compound 306



Compound 307

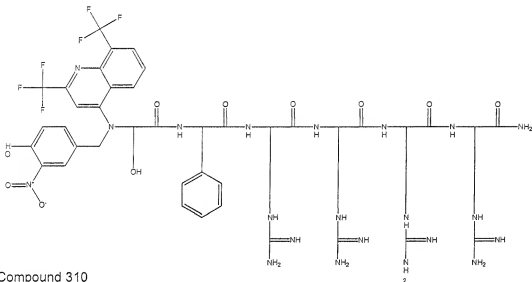


Compound 308

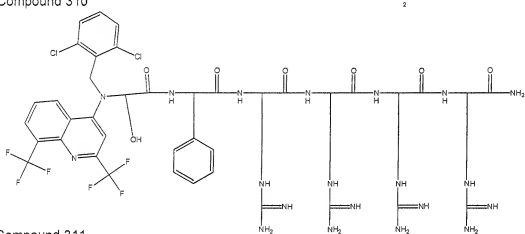


Compound 309

page 134 of 193

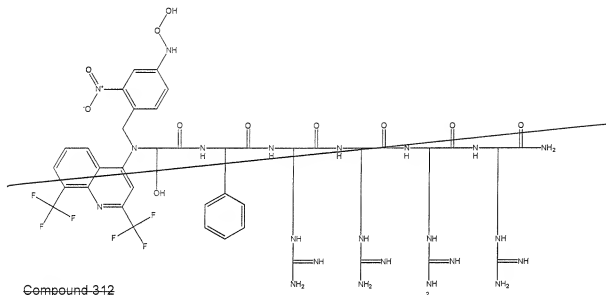


Compound 310

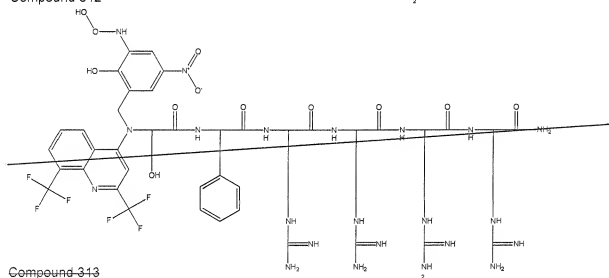


Compound 311

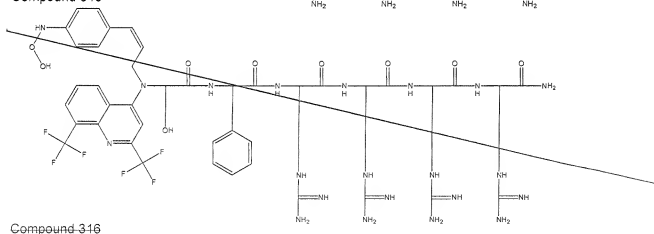
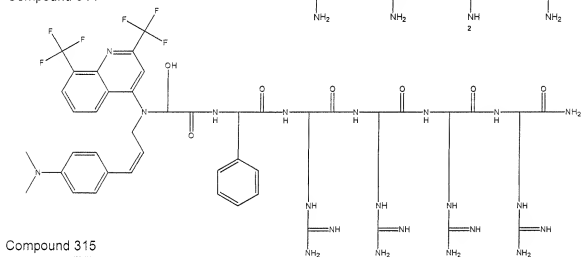
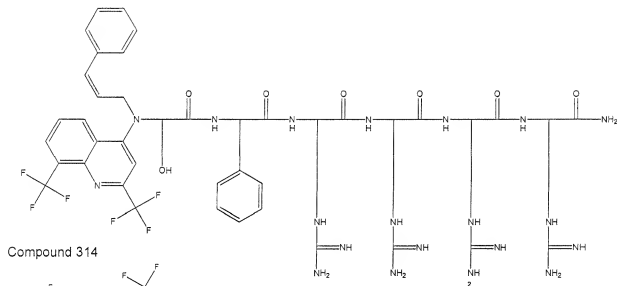
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 135 of 193



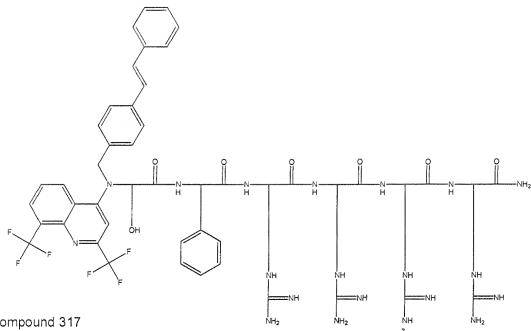
Compound 312



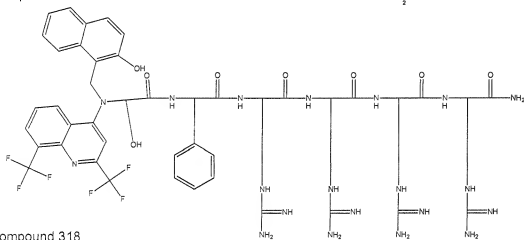
Compound 313



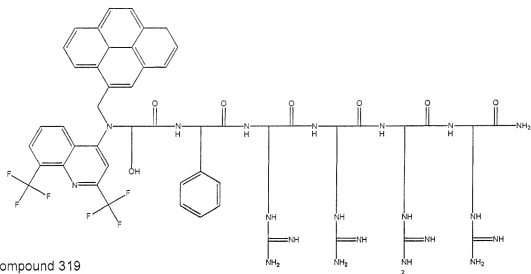
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 137 of 193



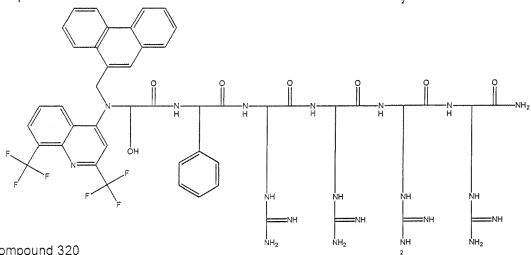
Compound 317



Compound 318

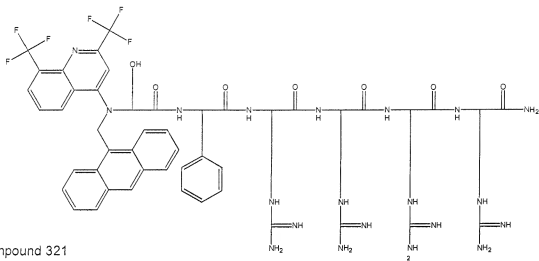


Compound 319

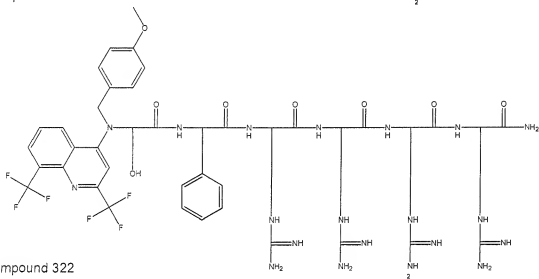


Compound 320

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 139 of 193

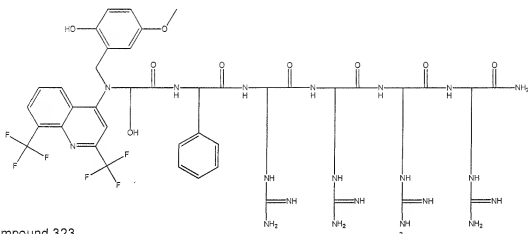


Compound 321

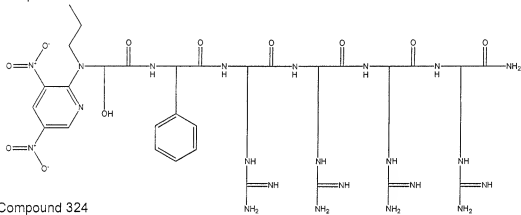


Compound 322

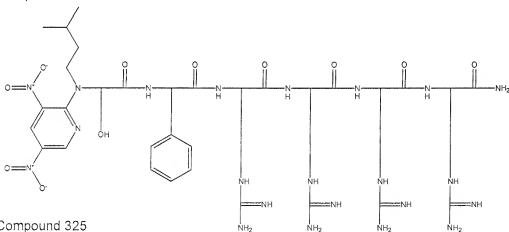
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 140 of 193



Compound 323

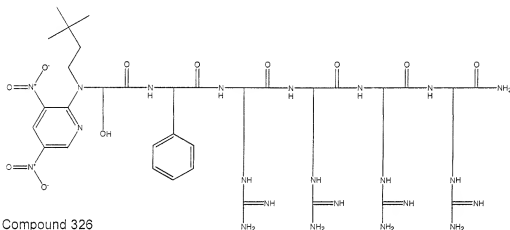


Compound 324

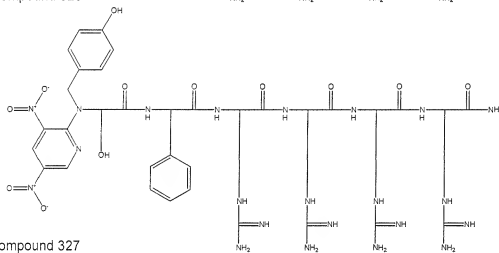


Compound 325

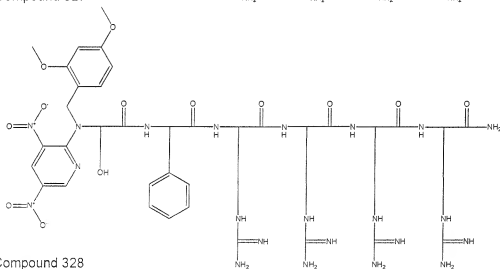
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 141 of 193



Compound 326

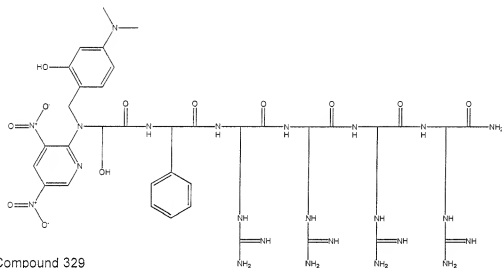


Compound 327

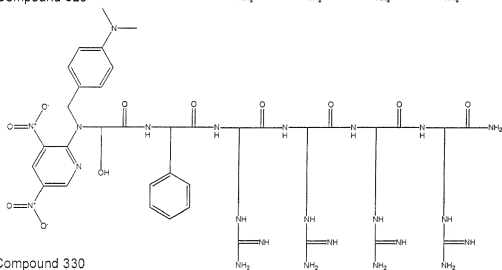


Compound 328

Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 142 of 193

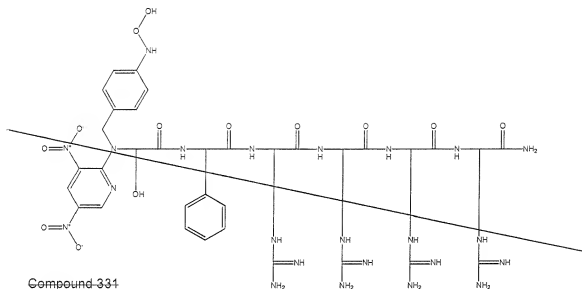


Compound 329

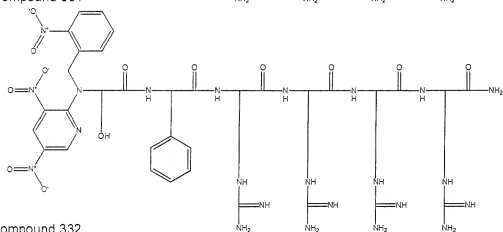


Compound 330

Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 143 of 193

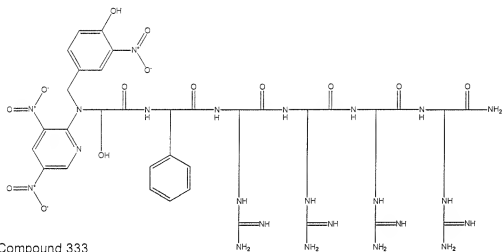


Compound 334

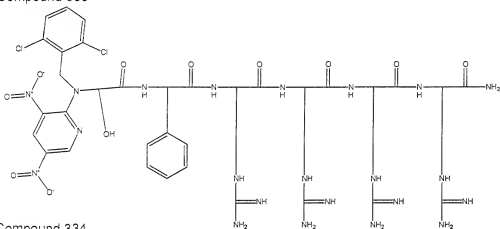


Compound 332

Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 144 of 193

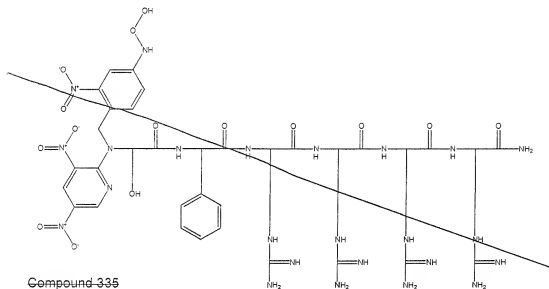


Compound 333

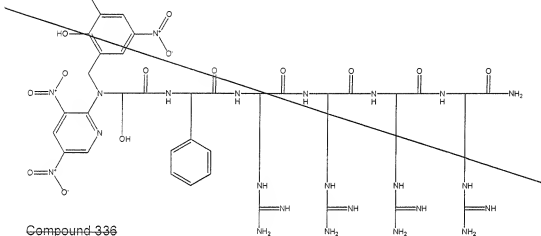


Compound 334

Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 145 of 193

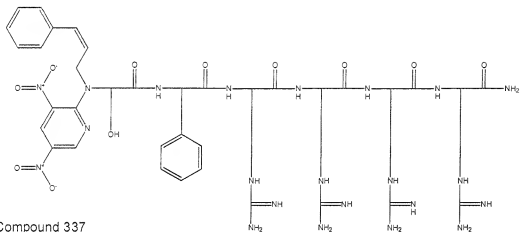


Compound 335

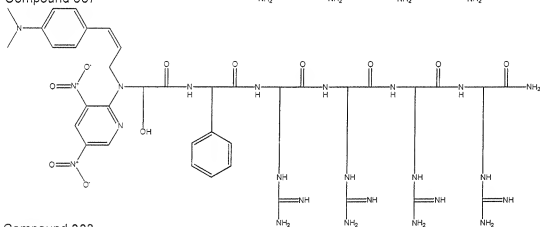


Compound 336

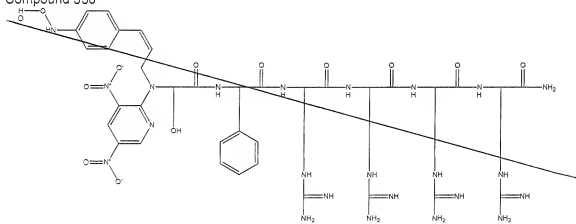
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 146 of 193



Compound 337



Compound 338

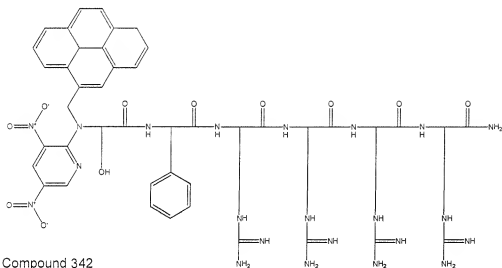


Compound 339

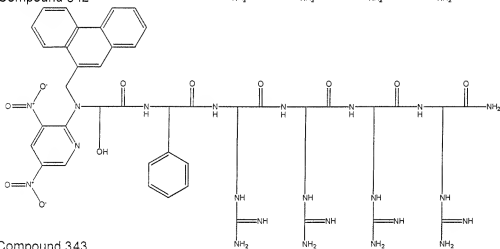
page 147 of 193



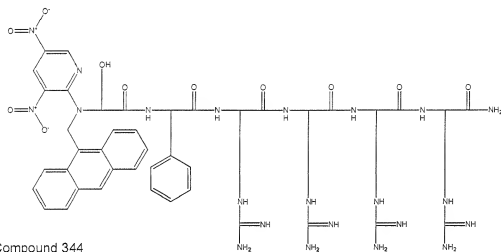
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 148 of 193



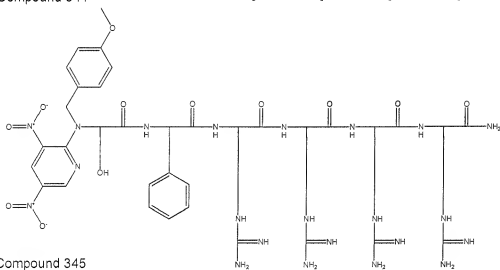
Compound 342



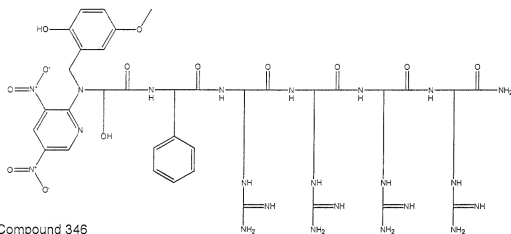
Compound 343



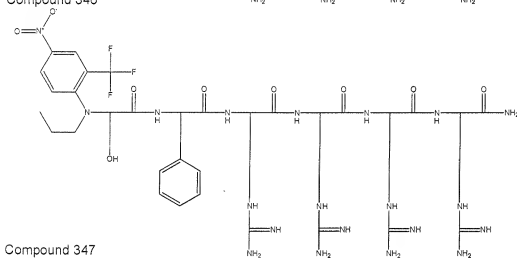
Compound 344



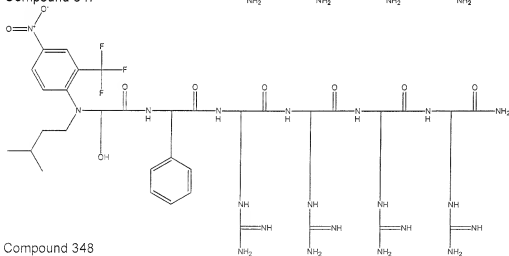
Compound 345



Compound 346

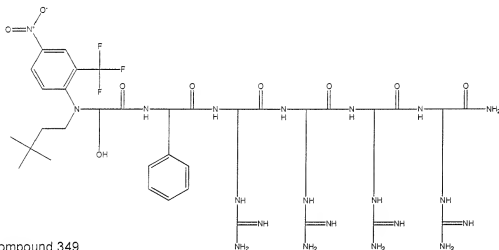


Compound 347

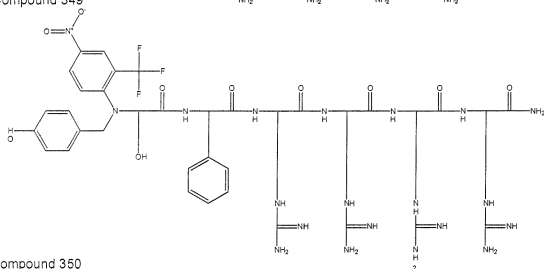


Compound 348

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 151 of 193

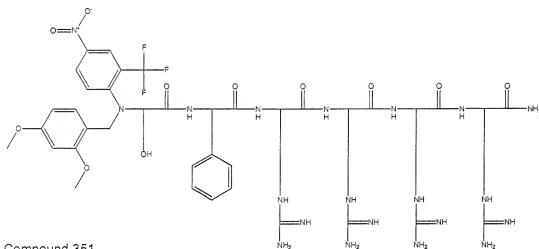


Compound 349

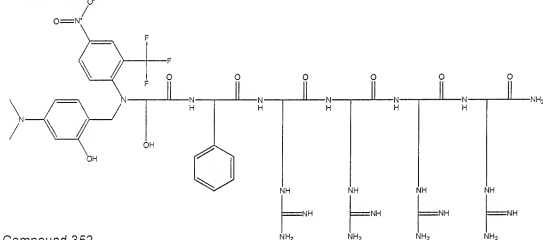


Compound 350

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 152 of 193

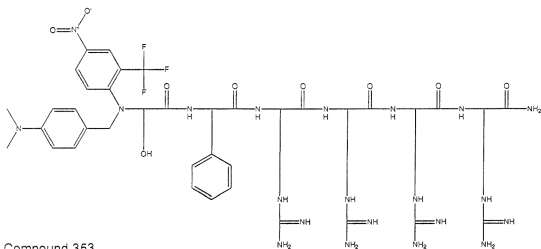


Compound 351

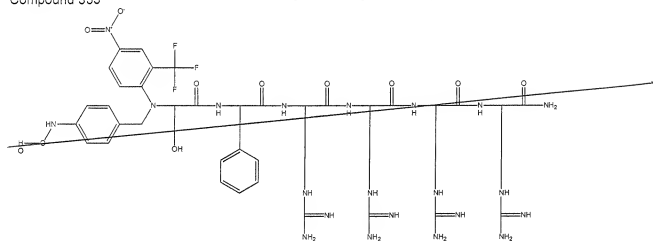


Compound 352

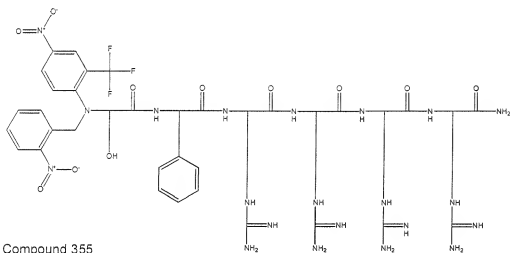
page 153 of 193



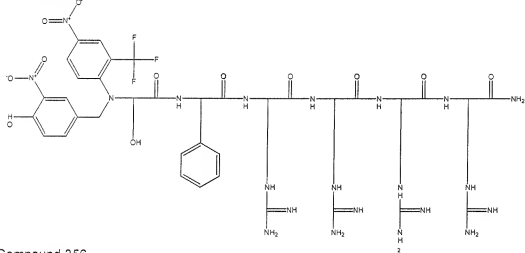
Compound 555



Compendio del

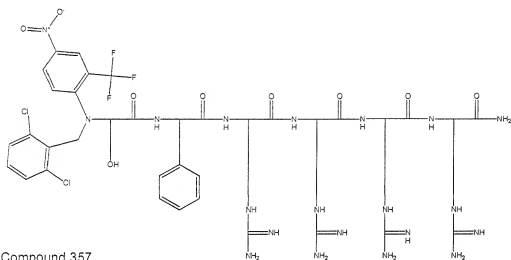


Compound 355

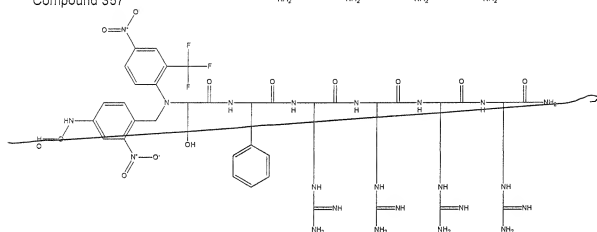


Compound 356

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 155 of 193

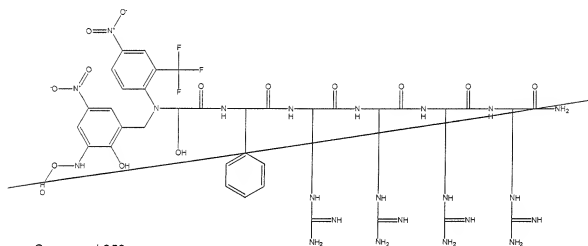


Compound 357

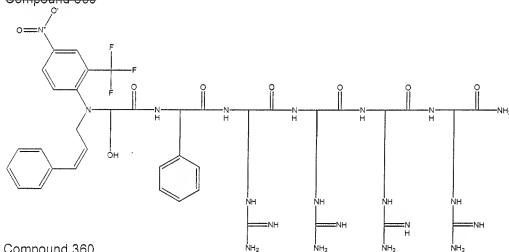


Compound 358

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 156 of 193

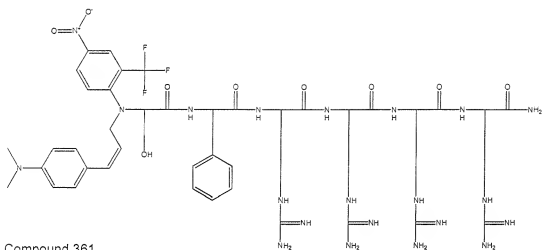


Compound-359

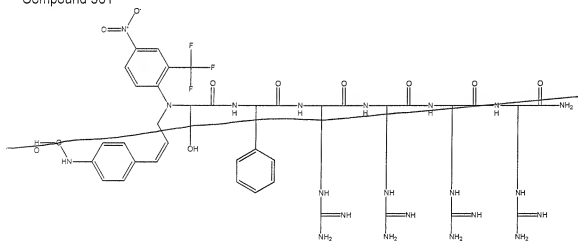


Compound 360

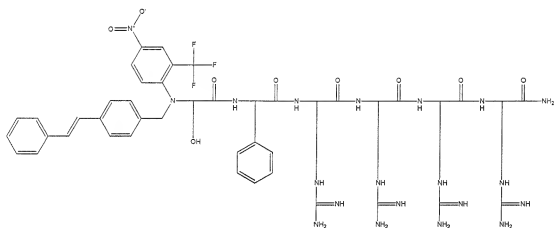
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 157 of 193



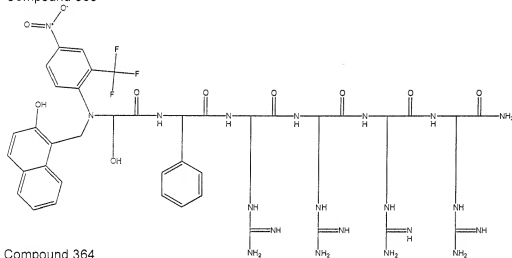
Compound 361



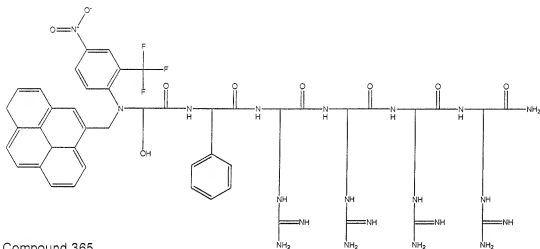
Compound 362



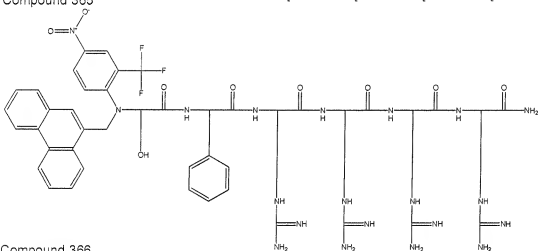
Compound 363



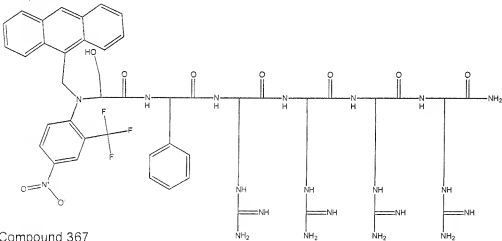
Compound 364



Compound 365

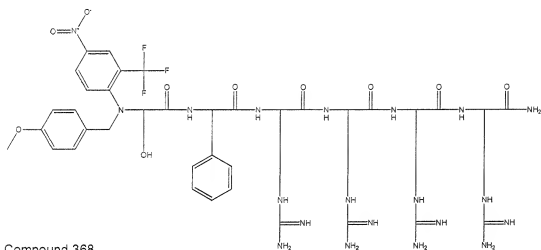


Compound 366

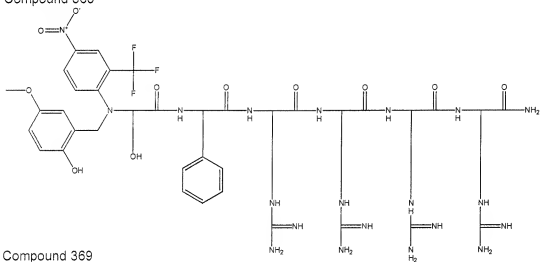


Compound 367

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 160 of 193

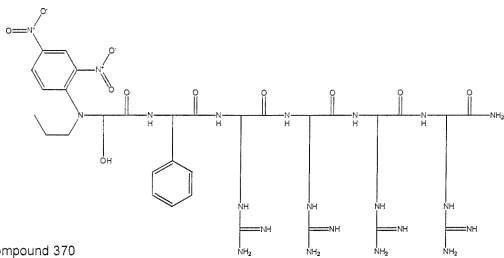


Compound 368

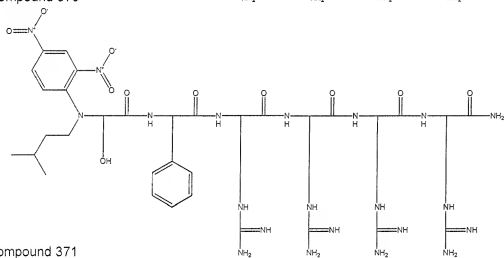


Compound 369

Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 161 of 193

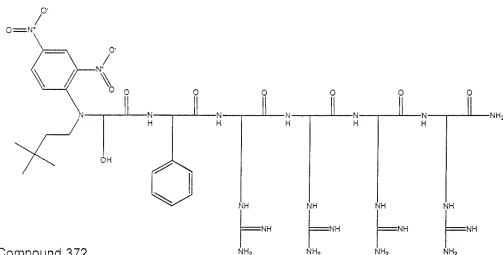


Compound 370

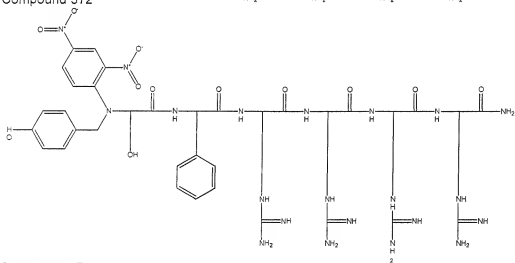


Compound 371

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 162 of 193

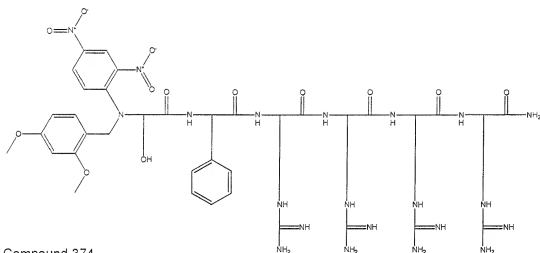


Compound 372

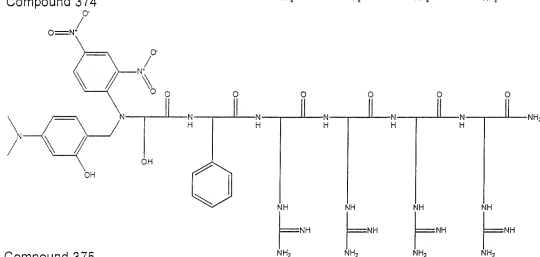


Compound 373

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 163 of 193

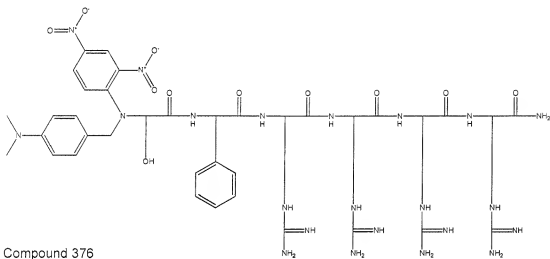


Compound 374

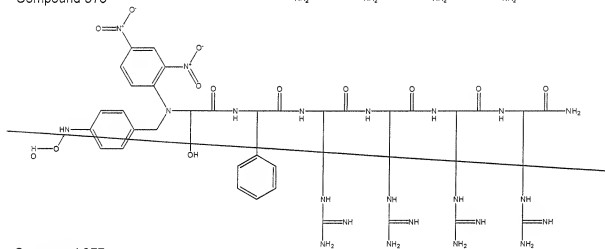


Compound 375

Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 164 of 193

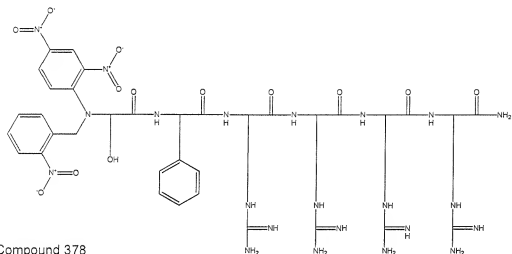


Compound 376

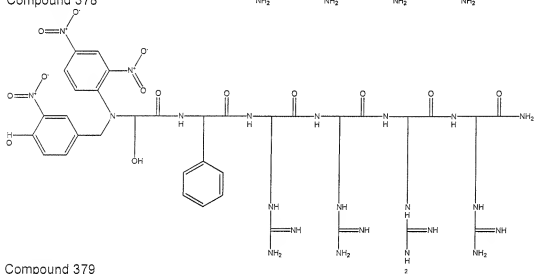


Compound 377

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 165 of 193

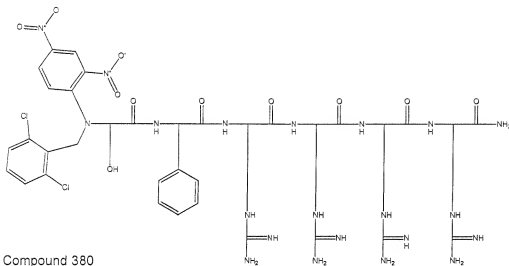


Compound 378

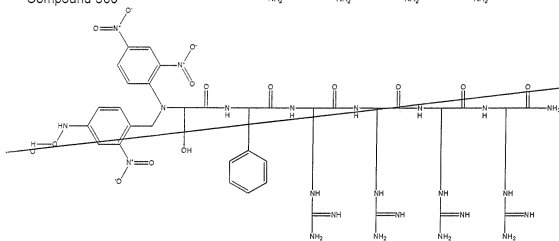


Compound 379

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 166 of 193

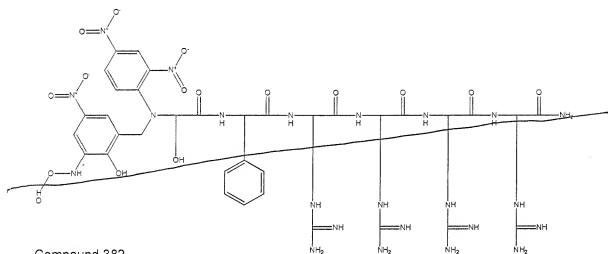


Compound 380

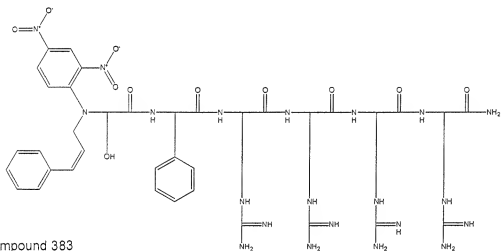


Compound 384

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 167 of 193

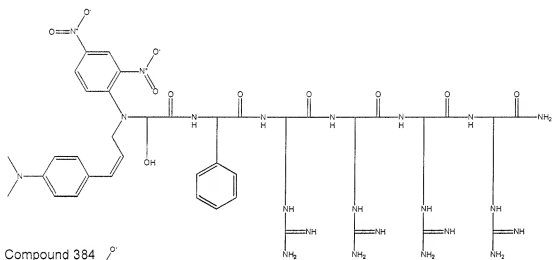


Compound 382

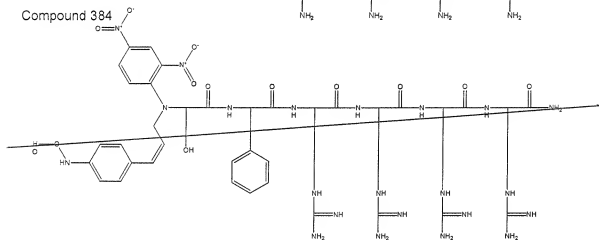


Compound 383

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 168 of 193

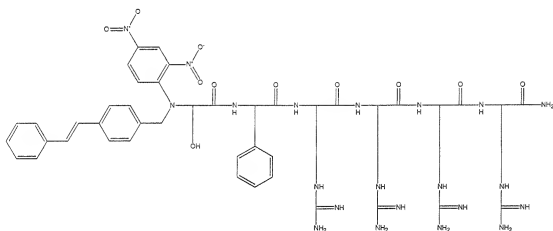


Compound 384

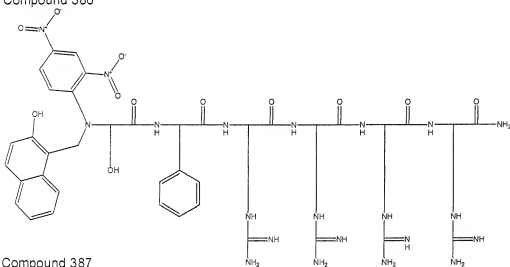


Compound 385

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 169 of 193

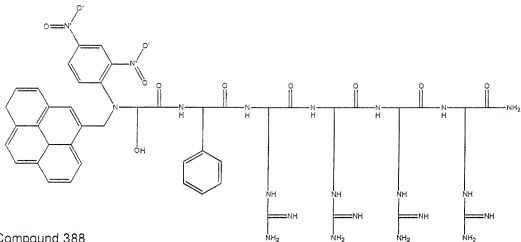


Compound 386

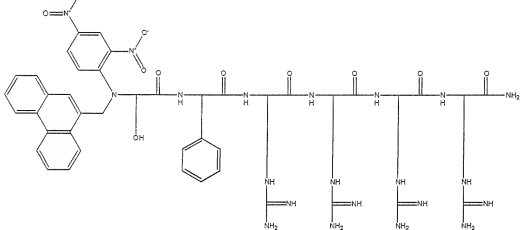


Compound 387

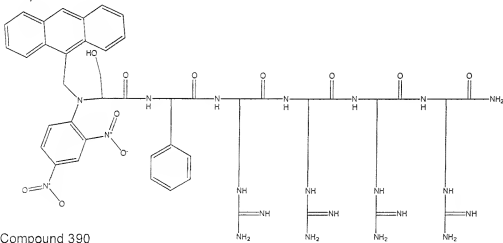
page 170 of 193



Compound 388

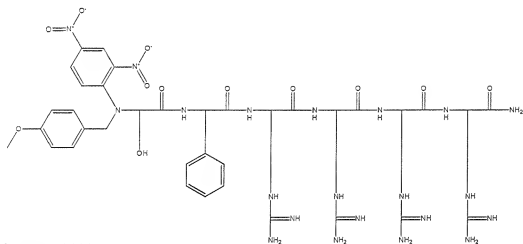


Compound 389

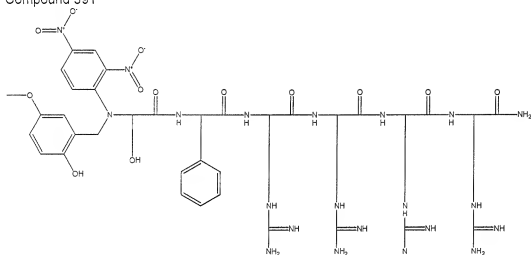


Compound 390

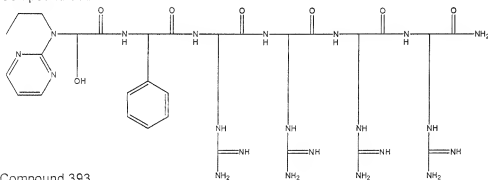
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 171 of 193



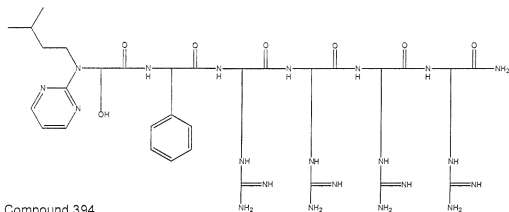
Compound 391



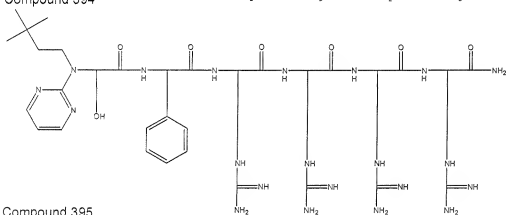
Compound 392



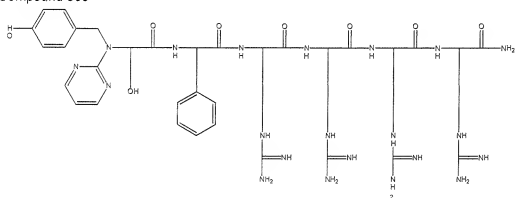
Compound 393



Compound 394

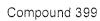


Compound 395

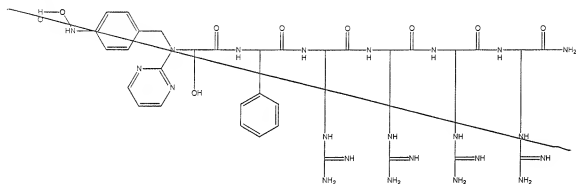


Compound 396

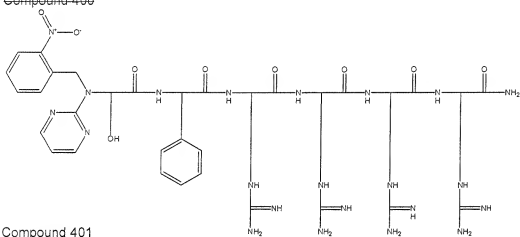
page 173 of 193



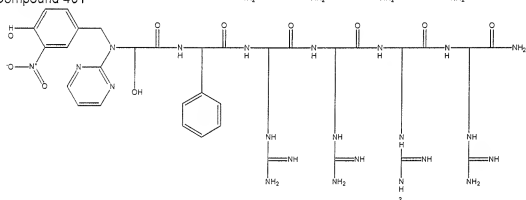
Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 174 of 193



Compound 400

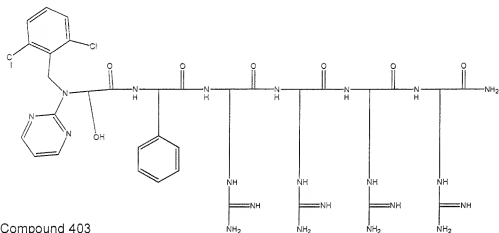


Compound 401

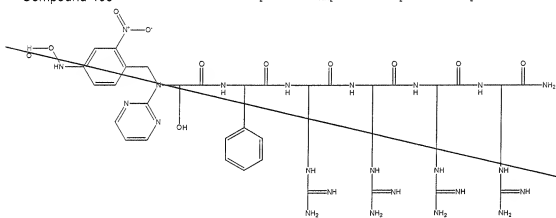


Compound 402

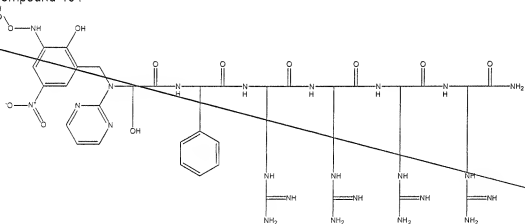
Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 175 of 193



Compound 403

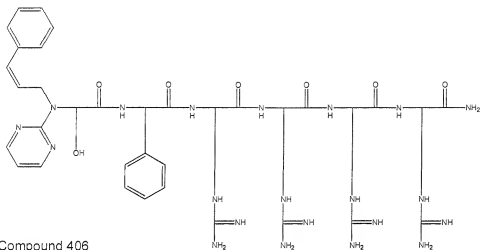


Compound 404

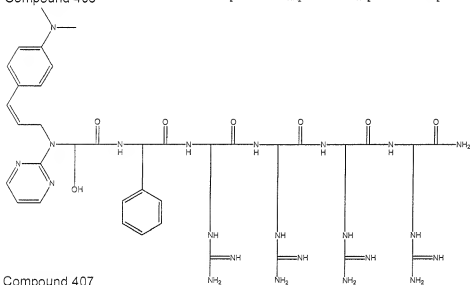


Compound 405

Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 176 of 193



Compound 406



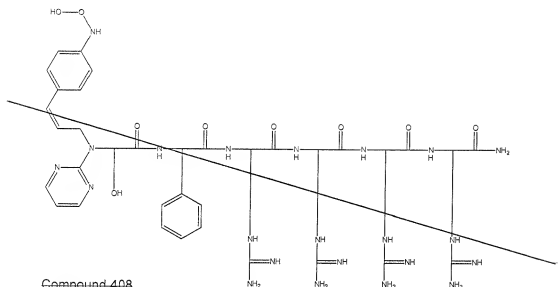
Compound 407

Applicant: David S. Lawrence

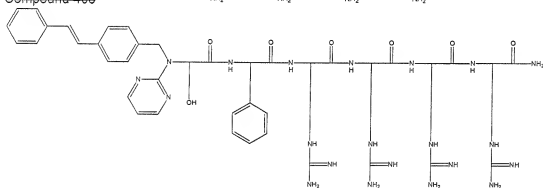
Serial No.: 10/755,086

Filed: January 9, 2004

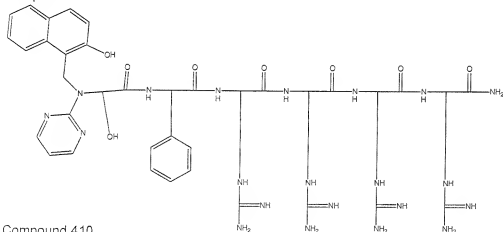
page 177 of 193



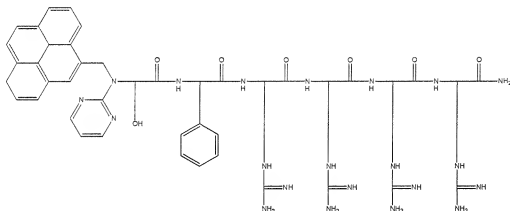
Compound 408



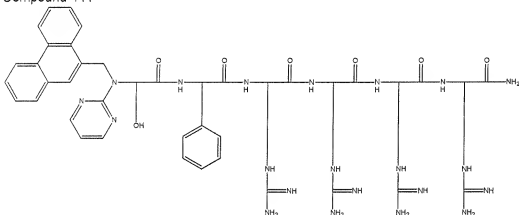
Compound 409



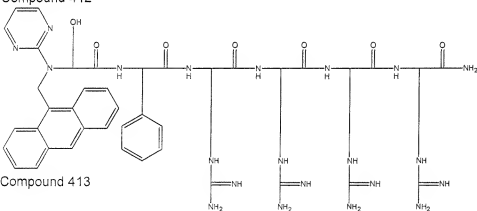
Compound 410



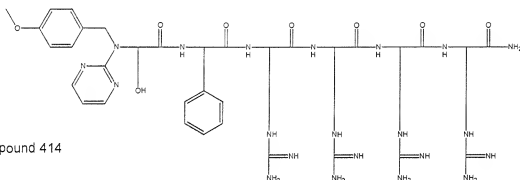
Compound 411



Compound 412

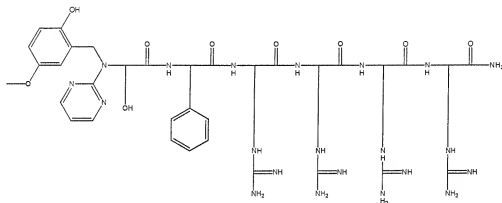


Compound 413



Compound 414

and

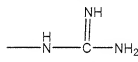


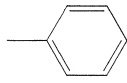
Compound 415

wherein amino acid chains are indicated as follows:

-OH represents serine,

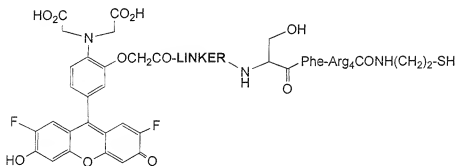
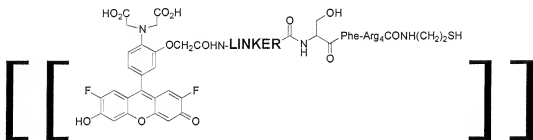
-NH₂ represents lysine,

 represents arginine, and

 represents phenylalanine.

Applicant: David S. Lawrence
Serial No.: 10/755,086
Filed: January 9, 2004
page 180 of 193

89. (Currently amended) A chemical compound comprising SEQ ID NO:1 having the structure:



wherein the LINKER is selected from the group consisting of the following:

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 181 of 193



a



b



c



d



e



f



g



h



i



j



k



l



m



n



o



p



q



r



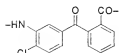
s



t



u



v

no linker

w

90. (Currently amended) A chemical compound having the structure: fluorophore-LINKER-X-FRRRRK-amide (SEQ ID NO:3); wherein F is phenylalanine; K is lysine; R is arginine; and X is serine, threonine, or tyrosine; ~~and~~ wherein the linker is selected from the group consisting of a carboxamide linker, an aminobenzoic acid linker, a sulfonamide linker, a urea linker, a thiourea linker, an ester linker, a thioester linker, an alkylamine linker, an arylamine linker, an ether linker, and a thioether linker; and wherein the chemical compound is a substrate for a protein kinase or a precursor of a substrate for a protein kinase.

91. (Original) The chemical compound of claim 90, wherein the fluorophore is a 7-nitrobenz-2-oxa-1,3-diazole derivative.

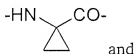
92. (Previously presented) The chemical compound of claim 90, wherein the fluorophore comprises a fluorescein group.

93. (Currently amended) The chemical compound of claim 90, wherein the fluorophore comprises a dansyl group, an acridine group, an Alexa Fluor® group, a BODIPY® group, an Oregon Green® group, a Rhodamine Green group, a Rhodamine Red-X group, a Texas Red® group, a Cascade Blue® group, a Cascade Yellow group, a Marina Blue® group, a Pacific Blue group, an AMCA-X group, or a coumarin group.

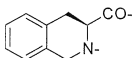
94-95. (Canceled)

96. (Previously presented) A chemical compound having the structure: fluorophore-LINKER-X-FRRRRK-amide (SEQ ID NO:3); wherein F is phenylalanine; K is lysine; R is arginine; and X is serine, threonine, or

tyrosine, wherein the linker is selected from the group consisting of N-methyl glycine, L-proline, D-proline,



and



97. (Previously presented) A chemical compound having the structure:
 fluorophore-LINKER-X-FRRRRK-amide (SEQ ID NO:3);

wherein F is phenylalanine; K is lysine; R is arginine; and X is serine, threonine, or tyrosine, wherein the linker is selected from the group consisting of the following:



a



b



c



d



e



f



g



h



i



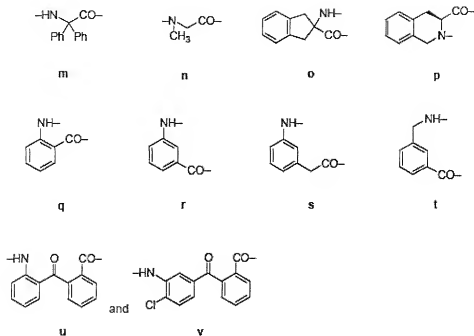
j



k



l



98. (Canceled)

99. (Currently amended) The chemical compound of claim 98 90, wherein the chemical compound is specific for protein kinase C.

100. (Original) The chemical compound of claim 99, wherein the chemical compound is specific for isoforms α , β , and γ of protein kinase C.

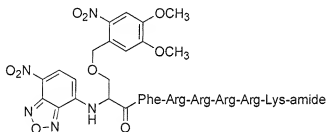
101. (Currently amended) The chemical compound of claim 98 90, the chemical compound is specific for protein kinase A, protein kinase B, protein kinase D, protein kinase G, Ca^{2+} /calmodulin-dependent protein kinase, mitogen-activated protein kinase,

protein kinase mos, protein kinase raf, protein tyrosine kinase, tyrosine kinase abl, tyrosine kinase src, tyrosine kinase yes, tyrosine kinase fps, tyrosine kinase met, cyclin-dependent protein kinase, or cdc2 kinase.

102. (Original) The chemical compound of claim 90, wherein the chemical compound further comprises a carbohydrate, a lipid or a nucleic acid.

103-121. (Canceled)

122. (Previously presented) A chemical compound comprising SEQ ID NO:3 having the structure



123. (Previously presented) A composition comprising a chemical compound of claim 89, and a carrier.

124-126. (Canceled)

127. (Currently amended) The precursor of a substrate for a protein kinase of claim 60, wherein the substrate comprises a metal ion chelator.

128. (Currently amended) The precursor of a substrate for a protein kinase of claim 127, wherein the metal ion is a magnesium ion or a calcium ion.

129. (Currently amended) The chemical compound of claim 90, wherein the chemical compound comprises a metal ion chelator and the metal ion chelator induces a change in fluorescence intensity.

130. (Original) The chemical compound of claim 129, wherein the metal ion is a magnesium ion or a calcium ion.

131. (Original) The chemical compound of claim 129, wherein the change in fluorescence intensity is at least a 20% change in fluorescence intensity.

132. (Canceled)

133. (Previously presented) The chemical compound of claim 90, wherein the linker comprises a turn to position the fluorophore in a location closer to the serine, the threonine or the tyrosine than the location the fluorophore would occupy in the absence of a turn in the linker.

134. (Previously presented) The chemical compound of claim 89, wherein the linker comprises a turn to position the fluorophore in a location closer to the terminal serine, the terminal threonine or the terminal tyrosine than the location the fluorophore would occupy in the absence of a turn in the linker.

135-136. (Canceled)

137. (Previously presented) The composition of claim 123, wherein the composition is a pharmaceutical composition and the carrier is a pharmaceutically acceptable carrier.

138. (Previously presented) A composition comprising the substrate of claim 49, and a carrier.

139. (Previously presented) The composition of claim 138, wherein the composition is a pharmaceutical composition and the carrier is a pharmaceutically acceptable carrier.

140. (Previously presented) A composition comprising the compound of claim 88, and a carrier.

141. (Previously presented) The composition of claim 140, wherein the composition is a pharmaceutical composition and the carrier is a pharmaceutically acceptable carrier.

142. (Previously presented) A composition comprising the compound of claim 90, and a carrier.

143. (Previously presented) The composition of claim 142, wherein the composition is a pharmaceutical composition and the carrier is a pharmaceutically acceptable carrier.

144-145. (Canceled)

146. (Previously presented) A composition comprising the compound of claim 122, and a carrier.

147. (Previously presented) The composition of claim 146, wherein the composition is a pharmaceutical composition and the carrier is a pharmaceutically acceptable carrier.

148. (Currently amended) A precursor of a substrate for a protein kinase ~~or a precursor of the substrate~~, wherein the ~~substrate or the~~ precursor comprises:

a peptide substrate for the protein kinase, wherein the peptide comprises a serine, a threonine, or a tyrosine on a terminal end of the peptide;

at least one fluorophore, wherein a fluorophore is attached to the serine, the threonine, or the tyrosine on the terminal end of the peptide;

wherein the fluorophore is attached directly to the peptide or the fluorophore is attached to the peptide by a linker selected from the group consisting of

Applicant: David S. Lawrence
 Serial No.: 10/755,086
 Filed: January 9, 2004
 page 189 of 193



a



b



c



d



e



f



g



h



i



j



k



l



m



n



o



p



q



r



s

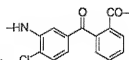


t



u

and



v

;

wherein a photolabile side chain is attached to the serine, the threonine, or the tyrosine on the terminal end of the peptide, and wherein the photolabile side chain blocks transfer of a phosphoryl group from adenosine triphosphate to a hydroxyl moiety of the serine, the threonine, or the tyrosine so that the precursor substrate cannot be phosphorylated by a protein kinase until the photolabile side chain is removed from the precursor substrate.

149. (Previously presented) A composition comprising the substrate of claim 83, and a carrier.

150. (Previously presented) The composition of claim 149, wherein the composition is a pharmaceutical composition and the carrier is a pharmaceutically acceptable carrier.

151. (Previously presented) A composition comprising the precursor of a substrate for a protein kinase of claim 59, and a carrier.

152. (Previously presented) The composition of claim 151, wherein the composition is a pharmaceutical composition and the carrier is a pharmaceutically acceptable carrier.

153. (Currently amended) A composition comprising the precursor of a substrate for a protein kinase ~~or a precursor of the substrate~~ of claim 148, and a carrier.

154. (Previously presented) The composition of claim 153, wherein the composition is a pharmaceutical composition and the carrier is a pharmaceutically acceptable carrier.